Educational solutions
Catalogue 2015 - 2016
Schneider Electric and education

This long-standing commitment was renewed in 2013 as part of a joint agreement between Schneider Electric and the French Ministry of Education.

“Schneider Electric has been committed to education and training for more than 50 years. Working together with the French Department for Education, we have forged relationships between stakeholders in the education system and the world of business. This new agreement provides a collaborative platform to drive this initiative forward, focusing on new energy management technologies on a national and international scale.”

At an international level, Schneider Electric France and the French Ministry of Education have agreed to consolidate their cooperation to support France’s partner countries in implementing effective vocational training policies. The idea is to target students in disadvantaged regions as part of a program aimed at contributing to expansion of the local economy and reducing poverty.

At a national level, this agreement promotes assistance in regional education authorities through the “Ingénieurs Pour l’École” (Engineers for School) scheme. The aim of all these initiatives is to bring the worlds of industry and education closer together.

Schneider Electric is committed to supporting teachers and trainers in the technical education field by sharing their expertise in new and emerging energy technologies.
The success of energy transition relies not only on the new energy technologies themselves, but also on the people using them.

France is committed to energy transition, a process which is driving our economic growth.

To bring about this change, we need not only to increase the use of renewable energies, but also to manage our energy requirements more efficiently.

The digitization of consumption data and production methods will help us redress the balance between consumption and sustainable development, between comfort and efficiency.

New technologies already exist, but they will only ever be successful if we prepare our young people to engage with the solutions of tomorrow.

These are the people at the heart of energy transition; our future professionals who will have to juggle multiple technologies: communications, energy efficiency, home automation, renewable energy and smart grids.

This is why Schneider Electric France Energy Training’s mission is to support the world of education in facing these new challenges.

Each year we train some 800 teachers and trainers through regional technical training courses and training days.

We are now also integrating more online resources into our teaching programmes and materials. Rather than being a strictly linear process, learning today should also involve a commitment from students to invest in their education in a more tailored approach.

This is Schneider Electric’s commitment - to support you throughout these changes and achieve a successful transition.

To find out more:
http://www.schneider-electric.fr/sites/france/fr/produits-services/energy-training/energy-training.page
To help you with your selection, this catalogue is divided into different sections:

**Safety**

For our range of electrical accreditation preparation, emergency lighting, fire safety and machine safety equipment

**Energy infrastructure**

For our range of residential or small business electrical distribution, neutral earthing systems, discrimination, electrical interference, renewable energy and EV charging station equipment

**Building management & energy efficiency**

For our range of building management, energy measurement, KNX control, fibre optic and ventilation equipment

**Industry & machines**

For our range of detection, motor starter, variable speed control, control system, communication and industrial system equipment

**BipBop**

For our purpose-designed range of equipment for teaching the basic concepts of electricity in developing countries

**Services**

For our range of services available to help get you started with our teaching equipment - such as commissioning and training - and the relevant contact information
## Contents

### 1- Safety

<table>
<thead>
<tr>
<th>Pages</th>
<th>Educational solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Accreditation cases</td>
</tr>
<tr>
<td>9</td>
<td>Accreditation test bench</td>
</tr>
<tr>
<td>10</td>
<td>Accreditation system</td>
</tr>
<tr>
<td>11</td>
<td>Additional case for BS accreditation</td>
</tr>
<tr>
<td>12</td>
<td>Safety awareness case</td>
</tr>
<tr>
<td>13</td>
<td>Addressable stand-alone emergency lighting unit case</td>
</tr>
<tr>
<td>14</td>
<td>Addressable emergency lighting pack</td>
</tr>
<tr>
<td>15</td>
<td>Addressable fire safety bench</td>
</tr>
<tr>
<td>16</td>
<td>Machine safety modular offer</td>
</tr>
</tbody>
</table>

### 2- Energy infrastructure

<table>
<thead>
<tr>
<th>Pages</th>
<th>Educational solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Distribution</td>
</tr>
<tr>
<td>22</td>
<td>Medium voltage cubicles</td>
</tr>
<tr>
<td>23</td>
<td>CAP (vocational training certificate) main switchboard</td>
</tr>
<tr>
<td>24</td>
<td>LV switchboard for vocational training</td>
</tr>
<tr>
<td>25</td>
<td>Energy management LV switchboard</td>
</tr>
<tr>
<td>26</td>
<td>Lighting and heating cabinets for RT2012 compliance</td>
</tr>
<tr>
<td>27</td>
<td>Cabinets for upgrading LV switchboards to energy management switchboards</td>
</tr>
<tr>
<td>28</td>
<td>IT system cabinet and secondary distribution boards</td>
</tr>
<tr>
<td>29</td>
<td>IT system enclosure for hospital environment</td>
</tr>
<tr>
<td>30</td>
<td>Earthing systems bench</td>
</tr>
<tr>
<td>31</td>
<td>Protection discrimination bench</td>
</tr>
<tr>
<td>32</td>
<td>Power quality</td>
</tr>
<tr>
<td>34</td>
<td>Reactive power factor correction</td>
</tr>
<tr>
<td>35</td>
<td>Electromagnetic interference</td>
</tr>
<tr>
<td>36 &amp; 37</td>
<td>Harmonic interference: HARMOTRIS - MINHARMOTRIS</td>
</tr>
<tr>
<td>38</td>
<td>Renewable energy generation</td>
</tr>
<tr>
<td>39</td>
<td>Operative parts for renewable energy bench</td>
</tr>
<tr>
<td>40</td>
<td>Solar potential</td>
</tr>
<tr>
<td>41</td>
<td>Micro solar power plant</td>
</tr>
<tr>
<td>42</td>
<td>PV-wind turbine system for remote sites</td>
</tr>
<tr>
<td>43</td>
<td>Photovoltaic characterization bench</td>
</tr>
<tr>
<td>44</td>
<td>Solar-powered water extraction</td>
</tr>
<tr>
<td>45</td>
<td>Tube solar water heater</td>
</tr>
<tr>
<td>46</td>
<td>Solar water heating system</td>
</tr>
<tr>
<td>47</td>
<td>Hydroelectric power bench</td>
</tr>
<tr>
<td>48</td>
<td>EV charging station adapted for training purposes</td>
</tr>
<tr>
<td>49</td>
<td>Installing an EV charging station</td>
</tr>
<tr>
<td>50</td>
<td>EV charging station (automotive disciplines)</td>
</tr>
<tr>
<td>51</td>
<td>CI/PRO KNX modular offer</td>
</tr>
<tr>
<td>52</td>
<td>Energy efficiency Mod KNX offer</td>
</tr>
<tr>
<td>53</td>
<td>HOME I/O software plus interface</td>
</tr>
<tr>
<td>54</td>
<td>KNX packs</td>
</tr>
<tr>
<td>55</td>
<td>Building energy management 3D cubicles</td>
</tr>
<tr>
<td>56</td>
<td>Building energy telemetry Mod offer</td>
</tr>
<tr>
<td>57</td>
<td>Energy efficiency enclosure</td>
</tr>
<tr>
<td>58</td>
<td>Electrical distribution software</td>
</tr>
<tr>
<td>59</td>
<td>Building communication</td>
</tr>
<tr>
<td>60</td>
<td>FTTH fibre optic packs</td>
</tr>
<tr>
<td>61</td>
<td>LAN-FTTO fibre optic packs</td>
</tr>
<tr>
<td>62</td>
<td>Fibre optic training bench</td>
</tr>
<tr>
<td>63</td>
<td>Fibre optic accessories</td>
</tr>
<tr>
<td>64</td>
<td>19” VDI pack</td>
</tr>
<tr>
<td>65</td>
<td>Energy efficiency</td>
</tr>
<tr>
<td>66</td>
<td>Greenhouse management system</td>
</tr>
<tr>
<td>67</td>
<td>Ventilation EE case</td>
</tr>
<tr>
<td>68</td>
<td>Ventilation EE modular offer</td>
</tr>
<tr>
<td>69</td>
<td>Ventilation bench with variable speed control</td>
</tr>
<tr>
<td>70</td>
<td>Air handling unit</td>
</tr>
<tr>
<td>71</td>
<td>Heating control bench</td>
</tr>
<tr>
<td>72</td>
<td>Air/air heat pump bench</td>
</tr>
<tr>
<td>73</td>
<td>Twin-flow ventilation bench</td>
</tr>
<tr>
<td>74</td>
<td>Residential VDI LEXHOME case</td>
</tr>
<tr>
<td>75</td>
<td>Residential and small business equipment pack</td>
</tr>
<tr>
<td>76</td>
<td>Residential modular offer</td>
</tr>
<tr>
<td>77</td>
<td>EE residential and small business modular offer</td>
</tr>
<tr>
<td>78</td>
<td>Energy management 3D cubicile</td>
</tr>
<tr>
<td>79</td>
<td>Energy management in the home</td>
</tr>
<tr>
<td>80</td>
<td>Energy management in the home according to RT2012</td>
</tr>
</tbody>
</table>
## Industry & machines

<table>
<thead>
<tr>
<th>Pages</th>
<th>Educational solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>106</td>
<td>Containment cabinet</td>
</tr>
<tr>
<td>108</td>
<td>Motor starter packs</td>
</tr>
<tr>
<td>111</td>
<td>Motor starter modular offer</td>
</tr>
<tr>
<td>112</td>
<td>Educational motors</td>
</tr>
<tr>
<td>113</td>
<td>Motor starter bench</td>
</tr>
<tr>
<td>114</td>
<td>Industrial sensors</td>
</tr>
<tr>
<td>115</td>
<td>Analog sensors and process control</td>
</tr>
<tr>
<td>116</td>
<td>Wireless industrial control</td>
</tr>
<tr>
<td>117</td>
<td>Pneumatic and electro-pneumatic panels</td>
</tr>
<tr>
<td>118</td>
<td>Variable speed control &amp; motion control</td>
</tr>
<tr>
<td>120</td>
<td>Electronic starter packs</td>
</tr>
<tr>
<td>121</td>
<td>Variable speed control packs</td>
</tr>
<tr>
<td>122</td>
<td>Servo motor packs</td>
</tr>
<tr>
<td>123</td>
<td>Linear axis packs</td>
</tr>
<tr>
<td>124</td>
<td>Variable speed drive training cabinets</td>
</tr>
<tr>
<td>125</td>
<td>ALTVAR 50 case</td>
</tr>
<tr>
<td>126</td>
<td>Load testing bench with asynchronous motors</td>
</tr>
<tr>
<td>127</td>
<td>Variable speed bench with motor</td>
</tr>
<tr>
<td>128</td>
<td>Variable speed bench with powder brake</td>
</tr>
<tr>
<td>129</td>
<td>Brushless training case</td>
</tr>
<tr>
<td>130</td>
<td>Mini-hoisting bench with cable winch</td>
</tr>
<tr>
<td>131</td>
<td>Hoisting bench with vector control</td>
</tr>
<tr>
<td>132</td>
<td>X and Z axis bench</td>
</tr>
<tr>
<td>133</td>
<td>Winch hoisting crane</td>
</tr>
<tr>
<td>134</td>
<td>Automation &amp; industrial communication</td>
</tr>
<tr>
<td>135</td>
<td>Automation software packs reserved for teaching</td>
</tr>
<tr>
<td>137</td>
<td>PLC introductory packs</td>
</tr>
<tr>
<td>138</td>
<td>Machine PLC packs</td>
</tr>
<tr>
<td>141</td>
<td>Industrial PLC packs</td>
</tr>
<tr>
<td>142</td>
<td>Introduction to programmed logic</td>
</tr>
<tr>
<td>143</td>
<td>Panel-mounted training PLCs</td>
</tr>
<tr>
<td>144</td>
<td>PLC and display unit on control desk</td>
</tr>
<tr>
<td>145</td>
<td>Automation modular offer</td>
</tr>
<tr>
<td>146</td>
<td>Automation operative part modular offer</td>
</tr>
<tr>
<td>147</td>
<td>HMI packs</td>
</tr>
<tr>
<td>148</td>
<td>HMI mobile cabinet</td>
</tr>
<tr>
<td>149</td>
<td>RFID pack</td>
</tr>
<tr>
<td>150</td>
<td>RFID card game modular offer</td>
</tr>
<tr>
<td>151</td>
<td>RFID case</td>
</tr>
<tr>
<td>152</td>
<td>Industrial communication modular offer</td>
</tr>
<tr>
<td>153</td>
<td>Industrial communication on pre-wired grid</td>
</tr>
<tr>
<td>154</td>
<td>Communication case</td>
</tr>
<tr>
<td>155</td>
<td>Communication case for teaching</td>
</tr>
<tr>
<td>156</td>
<td>Systems and subsystems</td>
</tr>
<tr>
<td>157</td>
<td>3D operative parts of industrial machines</td>
</tr>
<tr>
<td>158</td>
<td>Mock-up for introduction to the traffic management automation system</td>
</tr>
<tr>
<td>159</td>
<td>Mock-up for introduction to the lift automation system</td>
</tr>
<tr>
<td>160</td>
<td>Mock-up for introduction to the surface treatment system control system</td>
</tr>
<tr>
<td>161</td>
<td>Wiring panel for intermediate certification</td>
</tr>
<tr>
<td>162</td>
<td>1 digital axis training bench</td>
</tr>
<tr>
<td>163</td>
<td>Level control training bench</td>
</tr>
<tr>
<td>164</td>
<td>1 brushless axis training bench</td>
</tr>
<tr>
<td>165</td>
<td>Pneumatic joystick with rotary actuator</td>
</tr>
<tr>
<td>166</td>
<td>5-movement joystick</td>
</tr>
<tr>
<td>167</td>
<td>Automatic part sorting subsystem</td>
</tr>
<tr>
<td>168</td>
<td>Automated drilling system</td>
</tr>
<tr>
<td>169</td>
<td>Parcel sorting system</td>
</tr>
<tr>
<td>170</td>
<td>Stage lighting gantry</td>
</tr>
<tr>
<td>171</td>
<td>Industrial packaging machine</td>
</tr>
<tr>
<td>172</td>
<td>Integrated production system</td>
</tr>
<tr>
<td>173</td>
<td>Flexible dosing line</td>
</tr>
<tr>
<td>175</td>
<td>Packaging line</td>
</tr>
<tr>
<td>177</td>
<td>Assembly line</td>
</tr>
<tr>
<td>184</td>
<td>VIRTUAL UNIVERSE PRO 3D simulator</td>
</tr>
</tbody>
</table>

## BipBop offer

<table>
<thead>
<tr>
<th>Pages</th>
<th>Educational solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>188</td>
<td>BipBop Programme</td>
</tr>
<tr>
<td>189</td>
<td>Motor starter cabinet</td>
</tr>
<tr>
<td>190</td>
<td>Domestic cabinet</td>
</tr>
<tr>
<td>191</td>
<td>Electrical hazards awareness cabinet</td>
</tr>
<tr>
<td>192</td>
<td>Reactive power factor correction cabinet</td>
</tr>
<tr>
<td>193</td>
<td>Earthing systems and discrimination cabinet</td>
</tr>
<tr>
<td>194</td>
<td>Solar-powered water extraction</td>
</tr>
<tr>
<td>195</td>
<td>Traffic lights and lift</td>
</tr>
<tr>
<td>198</td>
<td>E-learning</td>
</tr>
<tr>
<td>199</td>
<td>System modernization offer</td>
</tr>
<tr>
<td>200</td>
<td>On-site commissioning</td>
</tr>
<tr>
<td>201</td>
<td>Electric vehicle charging station</td>
</tr>
<tr>
<td>202</td>
<td>Top-up courses</td>
</tr>
<tr>
<td>203</td>
<td>Learning space on the website</td>
</tr>
<tr>
<td>204</td>
<td>Training contacts</td>
</tr>
<tr>
<td>205</td>
<td>Product index</td>
</tr>
<tr>
<td>207</td>
<td>Reference index</td>
</tr>
</tbody>
</table>
Safety
Chapter 1
Safety

Accreditation cases ................................................................. page 8
Accreditation test bench ......................................................... page 9
Accreditation system .............................................................. page 10
Additional case for BS accreditation ........................................ page 11
Safety awareness case .......................................................... page 12
Addressable stand-alone emergency lighting unit case .......... page 13
Addressable emergency lighting pack .................................... page 14
Addressable fire safety bench ................................................ page 15
Machine safety modular offer ................................................. page 16
Accreditation cases

VALHABILIS

Learning objectives
- To understand and identify LV electrical hazards
- To identify components
- To analyze hazards
- To work in the vicinity of bare live parts
- To make adjustments and repairs
- To prepare for low voltage BO, B1V, BE and BS electrical accreditation according to standard NF C 18-510

Main industries
- Electrical engineering
- Energy engineering
- Building sector

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/100 VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>450 x 460 x 290 mm</td>
</tr>
<tr>
<td>Case 1</td>
<td>10 kg</td>
</tr>
<tr>
<td>Case 2</td>
<td>12.5 kg</td>
</tr>
</tbody>
</table>

Description
- The first case contains 2 domestic socket outlets and 1 lighting output for performing testing, locking, connection and replacement operations.
- The second case is designed to be connected to the first and is used to perform testing and measuring operations on a motor starter.

Personal protection equipment kits are available as an option:
- Voltage tester
- Lockout devices
- Warning tape
- PPE (personal protection equipment):
  - insulating gloves
  - face shield

Benefits
- Compact, mobile equipment
- Preparation for electrical accreditation in the building services sector

To order
- MD1AA630 VALHABILIS Voltage tester and PPE kits
Safety

Accreditation test bench

**Learning objectives**
- To understand and identify LV electrical hazards
- To identify components
- To analyze hazards
- To work in the vicinity of bare live parts
- To make adjustments and repairs
- To prepare for low voltage BO, B1V, BE and BS electrical accreditation according to standard NF C 18-510

**Presentation**
This bench has been designed to help prepare electricians for their electrical accreditation using equipment which replicates the environment in a commercial and industrial electrical installation. The bench features two separate sides - a commercial-domestic side and an industrial side.
It is available in two versions: assembled but not wired, or assembled and wired.

**Main industries**
- Electrical engineering
- Building sector

**Characteristics**

<table>
<thead>
<tr>
<th>Power supply</th>
<th>400 V/16 A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>1800 x 1100 x 700 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>100 kg</td>
</tr>
</tbody>
</table>

**Description**
The bench is mounted on a frame with locking castors.
- Commercial-domestic side:
  - switchboard
  - 2 power sockets (1 domestic, 1 commercial)
  - 1 light
  - stand-alone emergency lighting unit
  - housing service duct
  - EDF plate
  - modular cabinet
- Industrial side:
  - industrial cabinet
  - motor starter plate
  - reversing control unit
  - electric motor
  - ball screw for operating two limit switches
  - 1 emergency switch-off device

Available as an option: voltage tester and PPE kits
See page 8.

**Benefits**
- Replicates real-life situations
- Both sides can be used simultaneously
- Preparation for electrical accreditation in the building services sector

**To order**

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AAHABILAV</td>
<td>Accreditation test bench with motor and ball screw (wired)</td>
</tr>
<tr>
<td>MD1AAHABILAVNC</td>
<td>Accreditation test bench with motor and ball screw (non-wired)</td>
</tr>
<tr>
<td>MD1AA639</td>
<td>Voltage tester and PPE kits</td>
</tr>
</tbody>
</table>

Educational Solutions Catalogue - 2015/2016
**Safety**

**Accreditation system**

**HABILIS**

**Learning objectives**
- To study an industrial system
- To understand the issues associated with lockout
- To carry out practical exercises corresponding to real-life tasks
- To be trained to carry out B1V, B2V, BC, BE, BR and BS accreditation operations according to standard NF C 18-510.
- To identify components
- To analyze hazards
- To work in the vicinity of bare live parts
- To make adjustments
- To carry out maintenance and repair operations in the electrical cabinet

**Main industries**
- Electrotechnical engineering
- Electrical engineering

**Characteristics**

<table>
<thead>
<tr>
<th>Power supply</th>
<th>400 V/1 kVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>Enclosure without/with beacon: 1970/2160 x 860 x 670 mm, 186 kg; Operative part: 600 x 600 x 600 mm, 43 kg; PLC panel: 1150 x 340 x 430 mm, 15 kg</td>
</tr>
<tr>
<td>Weight</td>
<td></td>
</tr>
</tbody>
</table>

**Presentation**

The HABILIS system simulates operation of an industrial kneader in the food processing industry. It replicates a process which requires continuity of service.

The purpose of this equipment is to provide students with the opportunity to work on real-life scenarios encountered on industrial equipment. Students must apply the relevant electrical safety procedures.

Note: BS accreditation training requires the MD1AA638 BS cabinet (see page 11).

**Description**

**Enclosure with control cabinet**
- Electrical cabinet mounted on braked castors and stabilizer feet
- 1 externally controlled padlocking isolator
- 1 padlocking circuit breaker
- Power distribution by busbars protected by a removable screen
- 24 VAC control and signalling circuits
- 3 locking/padlocking feeders:
  - 1 motor feeder via variable speed drive backed up by UPS
  - 1 cover motor feeder (reversing contactor)
  - 1 heater feeder
- 1 free slot for mounting and wiring an extra circuit
- 1 UPS

**Kneader operative part**
- 1 mechanism for opening/closing the kneader bowl cover, operated by a 90 W motor
- 1 kneading blade operated by a 90 W motor
- 1 resistance heating element
- Inductive sensors and limit switches necessary for operation

**PLC panel**
- 1 Magelis HMI terminal
- 1 TSX Micro or M340 PLC

**Voltage tester and PPE kit**
- 1 voltage tester
- 2 insulated screwdrivers
- 2 beacons with bracket and 5 m cable
- Lockout accessories
- “Restricted work area” sign
- PPE (insulating gloves, face shield)

**To order**

<table>
<thead>
<tr>
<th>MD1AA513</th>
<th>MD1AA514</th>
<th>MD1AA516</th>
<th>MD1AA516MR</th>
<th>MD1AA518</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enclosure and control cabinet</td>
<td>Kneader operative part</td>
<td>TSX Micro PLC panel</td>
<td>M340 PLC panel</td>
<td>Voltage tester and PPE kit</td>
</tr>
</tbody>
</table>
Additional case for BS accreditation

BS case

Learning objectives

- To perform routine operations on low voltage electrical installations
- To prepare for BS accreditation by carrying out tasks in accordance with standard NF C 18-510

Presentation

This case is used to perform simple electrical tasks such as like-for-like replacement of a bulb or fuse to qualify for BS accreditation. It can be used on its own or with the HABILIS and VALHABILIS systems (both of which were marketed prior to the introduction of the regulations concerning BS accreditation).

Main industries

- Electrical engineering
- HVAC engineering
- Building sector

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/10 A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>230 x 300 x 120 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>2.5 kg</td>
</tr>
</tbody>
</table>

Description

ABS case containing:

- 1 cable gland plate output protected by a 10 A circuit breaker
- 1 lighting output protected by a 10 A fuse
- 1 lampholder for bulb replacement tasks

The cable gland output is designed to be replaced by a 2P+E socket

Accessories supplied with the case

- Set of 5 2P+E sockets
- 1 bulb
- Fuses
- 2 lockout devices

Benefits

- Cost-effective solution
- Compatible with HABILIS and VALHABILIS equipment

To order

MD1AA638 | BS accreditation case for HABILIS
Safety

Safety awareness case
SECURIS

Learning objectives
- To learn how to manage electrical and mechanical hazards in the following contexts:
  - Cutting and restoring the power supply, emergency stop circuit, self-powered supply
  - Opening the cover during operation, role of the limit switch, machinery directive
  - Insulation fault and contact with a live part
- To study thermal magnetic circuit-breakers
- To study RCBOs

Main industries
- Electrical engineering
- Electrotechnical engineering

Characteristics
<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/40 VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>520 x 380 x 150 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>7 kg</td>
</tr>
</tbody>
</table>

Description
The SECURIS case is designed to make students aware of the issues related to safety systems. It uses the example of a machine with a safety door/cover to explain how safety devices work to counter electrical and mechanical hazards.

To order
MD1VSE1F
SECURIS case
Addressable stand-alone emergency lighting unit case

Learning objectives
- To learn about the addressable emergency lighting system
- To identify system components
- To configure and address lighting units
- To configure the controller remotely via the web server
- To test the system using the controller
- To conduct maintenance operations with lockout
- To install additional equipment

Presentation
This case is used to study and set up an emergency lighting system. The addressable Dardo Plus system facilitates testing of stand-alone emergency lighting unit installations in compliance with standard EN 50172 by means of a 2-wire bus system which can be connected to up to 100 emergency lights. The lighting units are addressed and configured using coded rotary switches. Tests are performed automatically by the control unit and sent to the printer or to a PC for centralized data management.

Main industries
- Electrical engineering
- Electronic engineering
- Electronic engineering

Characteristics

| Power supply | 230 V/100 VA |
| Dimensions (H x W x D) | 560 x 470 x 345 mm |
| Weight | 19 kg |

Benefits
- Use of Web server
- Testing and safety procedures
- Option to extend the number of addressable emergency lighting units

To order
- MDGVBAES: Stand-alone emergency lighting unit system
- MDGBAESPCK: Address tester option

Available as an option
Address tester: Used to test addresses and help prevent any configuration errors

Description
- 1 LED stand-alone emergency evacuation lighting unit
- 1 fluorescent tube stand-alone emergency background lighting unit
- 1 Dardo control unit
- 1 DCM communication module with web server
- 1 DARDO printer
- 1 halogen spotlight
- 1 x 24 V power supply
- Dardo bus measuring points
- Switches for disconnecting the batteries in the stand-alone emergency lighting units
Addressable emergency lighting pack
Stand-alone emergency lighting unit pack

Learning objectives
- To study an addressable emergency lighting system
- To identify and address lighting units
- To test system components
- To configure and control the system remotely via web server

Presentation
The stand-alone emergency lighting unit pack is used to study and set up an addressable emergency lighting system. Addressing is simple, using 2 thumbwheels on each lighting unit. A tester device helps prevent errors by testing the addresses and detecting any duplicates or missing addresses. Each lighting unit is tested according to the addressing scheme. A test report is available immediately.

The system is fully scalable, offering the options to add external stand-alone emergency lighting units, remote monitoring and SMS and/or e-mail maintenance alerts (DCM interface).

Main industries
- Electronic engineering
- Electrical engineering

Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>Power supply</th>
<th>Dimensions (H x W x D)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pack contents</td>
<td>230 V/100 VA</td>
<td>400 x 400 x 600 mm</td>
<td>12 kg</td>
</tr>
</tbody>
</table>

Pack contents
- 1 Dardo Plus control unit
- 1 DCM communication module with web server
- 1 LED stand-alone emergency evacuation lighting unit
- 1 fluorescent tube stand-alone emergency background lighting unit
- 1 x 12 V halogen spotlight (for simulating actual lighting)
- 1 x 24 V power supply

Available as an option
- 1 Dardo Plus Printer for printing the test reports required by standard EN 50172
- Address tester

Benefits
- Set up in 3D cubicles
- Complete predefined package
- Low-cost solution

To order
- MD1APESADR Addressable emergency lighting pack
- MD1APESPRT Printer for Dardo Plus pack
- MDGBAESPK Address tester option
Safety

Addressable fire safety bench

Learning objectives
- To study and implement the standards and regulations relating to a fire safety system
- To wire the different elements
- To configure and program the control and signalling equipment
- To carry out maintenance operations:
  - preventive maintenance of system components
  - corrective maintenance of the system

Presentation
The fire safety bench represents part of an establishment that receives the public (such as a holiday village). The safety components are located in the different parts of the building represented and provide the following functions:
- acknowledgement and processing of fire hazard information
- management of alarms and emergency shutdown

Main industries
- Electronic engineering
- Electrical engineering
- Electrical engineering

Characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>230 V/850 VA</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>1930 x 1070 x 600 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>93 kg</td>
</tr>
</tbody>
</table>

Description
The fire safety bench represents part of an establishment that receives the public (such as a holiday village). The safety components are located in the different parts of the building represented and provide the following functions:
- acknowledgement and processing of fire hazard information
- management of alarms and emergency shutdown

- Mobile frame on locking castors
- 1 addressable optical smoke detector
- 1 addressable thermo-velocimetric heat detector
- 2 addressable manual call points
- 1 electromagnetic release activated by current interruption
- 1 sound diffuser
- 1 activation indicator
- 1 satellite stand-alone siren unit
- 1 control and signalling device
- 1 fire control panel
- 1 central fire safety system
- 1 test aerosol
- 1 set of safety leads
- 2 emergency release keys
- 1 control and signalling software package for PC with connection cable
- 1 set of fuses and end of line resistors

Benefits
- Representation of a real-life installation
- Rugged wiring on safety sockets

To order
MDG99130A Addressable fire safety bench
Machine safety modular offer

Learning objectives
- To study the different safety categories and determine the levels of risk
- To install appropriate safety devices in compliance with the relevant standards
- To study modular safety functions:
  - emergency stop monitoring
  - safety switch monitoring
  - coded magnetic switch monitoring
  - zero speed monitoring via connection to a key operated safety limit switch

Main industries
- Electrotechnical engineering
- Industrial maintenance

Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>Qty</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td></td>
<td>230/400 V/100 VA</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td></td>
<td>Operative part frame 640 x 1000 x 410 mm 29 kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Control part frame 910 x 1030 x 400 mm 6.5 kg</td>
</tr>
<tr>
<td>Weight</td>
<td></td>
<td>Modules 70 x 150 x 245 mm 0.7 kg</td>
</tr>
</tbody>
</table>

Presentation

The machine safety modular offer is made up of 2 parts: an operative part mounted on a panel and a control part mounted on a modular frame. Its purpose is for students to build the safety circuit by wiring the safety switches, PREVENTA modules and line contactors with the aim of learning about safety categories 3 and 4.

The operative part comprises 2 rotating parts protected by removable screens and equipped with safety limit switches.

Components

Operative part
Safety switch with turret head, safety interlock switch, safety limit switch, coded magnetic switch; wired via double-recess sockets.

Control part
The MD1AMLSECU standard offer comprises the modules listed below. You can also order each module separately.

<table>
<thead>
<tr>
<th>Description</th>
<th>Qty</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support frame</td>
<td>1</td>
<td>MD1AM000</td>
</tr>
<tr>
<td>Emergency stop monitoring safety module</td>
<td>1</td>
<td>MD1AM9001</td>
</tr>
<tr>
<td>Emergency stop monitoring safety module and limit switch</td>
<td>1</td>
<td>MD1AM9002</td>
</tr>
<tr>
<td>Coded magnetic switch monitoring module</td>
<td>1</td>
<td>MD1AM9003</td>
</tr>
<tr>
<td>Time delay monitoring module</td>
<td>1</td>
<td>MD1AM9004</td>
</tr>
<tr>
<td>Zero speed monitoring module</td>
<td>1</td>
<td>MD1AM9005</td>
</tr>
<tr>
<td>Time delay monitoring module</td>
<td>1</td>
<td>MD1AM9006</td>
</tr>
<tr>
<td>24 V DC/2.5 A power supply module</td>
<td>1</td>
<td>MD1AM4001</td>
</tr>
<tr>
<td>Auxiliary contactor modules</td>
<td>2</td>
<td>MD1AM1011</td>
</tr>
<tr>
<td>Thermal-magnetic circuit breaker module</td>
<td>1</td>
<td>MD1AM1003</td>
</tr>
<tr>
<td>Contactor module</td>
<td>1</td>
<td>MD1AM1008</td>
</tr>
</tbody>
</table>

Benefits
- Quick, safe setup
- Rugged wiring using safety sockets

To order
MD1AMP011 Machine safety offer - operative part
MD1AMLSECU Machine safety offer - modular control part
Energy infrastructure
### Chapter 2
Energy infrastructure

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution</td>
<td>20</td>
</tr>
<tr>
<td>Power quality</td>
<td>32</td>
</tr>
<tr>
<td>Renewable energy</td>
<td>38</td>
</tr>
<tr>
<td>Electric vehicles</td>
<td>52</td>
</tr>
</tbody>
</table>
Energy infrastructure

Distribution
Energy infrastructure
Distribution

Medium voltage cubicles .................................................. page 22
LV switchboard for professional training ....................... page 23
LV switchboard for vocational training ......................... page 24
Energy management LV switchboard ............................. page 25
Lighting and heating cabinets for RT2012 compliance ...... page 26
Cabinets for upgrading LV switchboards to energy
management switchboards ............................................ page 27
IT system cabinet and secondary distribution boards .... page 28
IT system enclosure for hospital environment ............... page 29
Earthing systems bench ............................................... page 30
Protection discrimination bench .................................... page 31
Medium voltage cubicles

Learning objectives
- To learn about MV installations
- To identify the different MV components
- To identify the hazards
- To use and operate an MV installation:
  - opening, closing, earthing
  - interlocking operations, padlocks
  - lockout
- To learn about the different types of disconnection
- To perform maintenance operations such as:
  - replacing MV fuses
  - checking the interlocking device
  - adapting the auxiliaries
- To apply the NF C 18-510 standard safety requirements
- To prepare for MV accreditation

Presentation
This equipment is set up according to customer specification and is designed to help teach students the practices and procedures for working on medium voltage installations.
The medium voltage equipment has been modified for training purposes. The cubicles are set up for a 400 V power supply but operate in the same way as if they were powered at 20 kV. The transformer is supplied without oil or windings.
The standard offer comprises two IM cubicles, a QM cubicle and an MV/LV transformer but other combinations are possible (e.g. 1 IM + 1 QM with transformer, 1 IM + 1 QM without transformer, etc.). An LV switchboard is available as an option where an interlocking circuit is required.

Description
IM switch cubicle
- 1 x 400 A 3-pole busbar
- 1 SF6 gas-insulated switch disconnector + earthing switch
- 1 CIT type manual operating mechanism
- 3 voltage presence indicators
- 3 single-pole dry type cable connections

Motorized OM fuse switch combination cubicle
- 1 x 400 A 3-pole busbar
- 1 SF6 gas-insulated switch disconnector + earthing switch
- 1 x 48 VDC motorized operating mechanism
- 1 set of 3 SOLEFUS 24 kV fuses
- 1 SEPAM series 20 protection relay
- 1 MV/transformer/LV switchboard interlock (Profalux C4 type)

Accessories provided
- Connection cables
- Safety accessories kit: pole, voltage tester, stool, gloves, extinguisher, etc.

Available as an option
- MINERA 100 kVA MV/LV oil transformer adapted for training purposes
- LV switchboard with plug-in circuit breaker lockable via interlock
- Primary/secondary injection kit for testing operation of the protection devices

Main industries
- Electrotechnical engineering
- Industrial maintenance

Characteristics
| Power supply | 400 V/6.4 kVA |
| Dimensions (H x W x D) | 2 IM + QM cubicles 2510 x 1125 x 1000 mm 480 kg |
| Transformer | 1250 x 1000 x 700 mm 300 kg |
| LV switchboard | 2310 x 1000 x 530 mm 214 kg |

Benefits
- Simulates actual behaviour of MV equipment
- On-site installation and training
- Full locking sequence up to LV switchboard

To order
- UEHGHITA 2 IM + 1 QM with on-site commissioning
- UEHGHTR Transformer adapted for training purposes
- UEHGINJ Injection testing kit

SM6 QM cubicle
On-site cubicle + transformer + LV switchboard installation
Learning objectives
- To perform wiring and accreditation tasks with intervention on busbars
- To identify components
- To perform wiring tasks in accordance with regulations
- To check wiring to ensure that it is mechanically and electrically sound
- To connect teaching equipment in order to take energy measurements

Presentation
This LV switchboard enclosure is designed for students to learn how to perform wiring tasks on a low voltage switchboard. It has a front and rear access door each with different keys to prevent electrical shock hazards.

The enclosure is supplied ready-assembled with the components mounted in position, either pre-wired or non-wired depending on the version. An accessories kit and a tool kit are available to help perform the wiring tasks.

Description
- Primary power supply
- NS160 residual current circuit breaker
- Visible break switch disconnector
- 1 busbar protected by transparent cover
- 1 PM700 power meter with 3 CTs
- Emergency stop device on enclosure
- 11 x 2 to 63 A feeders
- Feeder control via ON/OFF pushbutton with signalling
- Illuminated beacon to indicate power on
- Power terminal blocks

Available as an option
- Accessories kit: wires, lugs, cable ends and sheaths
- Tool kit: screwdriver, pliers, Allen keys

Main industry
- Electrotechnical engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>400 V/20 kVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>2310 (with beacon) x 1000 x 530 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>214 kg</td>
</tr>
</tbody>
</table>

Non-wired LV switchboard for professional training

Benefits
- Enclosure identical to real LV switchboards
- Powering real systems
- Power and control wiring tasks

To order
- MD1AA720NC: Non-wired LV switchboard
- MD1AA720: Wired LV switchboard
- MD1AA728: Accessories kit
- MD1AA729: Tool kit
**LV switchboard for vocational training**

**Learning objectives**
- To analyze the functions of an LV switchboard
- To identify components
- To carry out commissioning and maintenance operations on the LV switchboard
- To configure/set parameters for the communication network
- To wire a feeder
- To lock out a feeder
- To implement reactive power factor correction
- To study a UPS
- To prepare for electrical accreditation

**Presentation**

This LV switchboard adapted for teaching purposes is designed for students to learn how to implement the different technologies used in an LV switchboard (source changeover, power meter, UPS, controller, load shedding, etc.). It is used to distribute and control electrical energy on a dedicated teaching platform.

A PLC is used to centralize data via a Modbus and/or Ethernet link.

**Main industries**
- Electrical engineering
- Electrotechnical engineering

**Characteristics**

<table>
<thead>
<tr>
<th>Power supply</th>
<th>400 V/20 kVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>2500/2110 x 1400 x 550 mm (with/without beacon)</td>
</tr>
<tr>
<td>Weight</td>
<td>260 kg</td>
</tr>
</tbody>
</table>

**Description**

The composition of the feeders will be adapted according to customer specification (see the selection table on our website).

- 1 PRISMA P cubicle with cable duct
- 1 normal/backup power supply via 100 A switch disconnectors
- 1 NS160N circuit breaker-changeover switch plate with STR22 protection relay
- 1 motor mechanism with BA controller for source changeover
- 2 Powerclip busbars
- 2 RCP phase control relays
- 1 RCU voltage control relay
- 10 feeders maximum, pre-wired depending on the configuration
- Acti 9 Smartlink communication system
- 1 TSX57, M340 or M221 PLC with web server module and HTML pages
- 1 x 1 kVA UPS
- 1 PM800 power meter

Available as an option

- Reactive power factor correction cabinet with capacitors

**Benefits**

- Switchboard mounted, wired, tested and validated by Schneider Electric
- Remote monitoring
- Feeders can be adapted to suit the teaching platform

**To order**

<table>
<thead>
<tr>
<th>MD1AA780P</th>
<th>LV switchboard for vocational training with TSX57</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AA780MR</td>
<td>LV switchboard for vocational training with M340</td>
</tr>
<tr>
<td>MD1AA780SO</td>
<td>LV switchboard for vocational training with M221</td>
</tr>
</tbody>
</table>
Energy management LV switchboard
SMART PANEL

Learning objectives
- To study the equipment
- To wire up a feeder
- To set up and lock out feeders
- To study Ethernet and Modbus communication
- To study the RT2012 French energy efficiency standard
- To implement the necessary data-driven energy efficiency actions
- To manage alarms and preventive maintenance

Presentation
The SMART PANEL is Schneider Electric's new energy management switchboard adapted for teaching purposes. It integrates the latest electrical distribution technologies for improving energy efficiency. It is supplied with the RT2012 “Analyses and Solutions” guide and the Energy Efficiency White Paper.

Description
The composition of the feeders will be adapted according to customer specification (see the selection table on our website).
- PRISMA P cubicle with cable duct
- Digitized switchboard
- Acti 9 Smartlink Ethernet communication system
- Data feedback and feeder control
- Embedded and stand-alone functions: measurement and control of energy and fluid consumption levels
- Main Compact NSX circuit breaker with Ethernet interface
- Communication interface for the modular products (circuit breakers, meters, etc.)
- Choice of 10 feeders (see selection table)
- Real-time control and monitoring via touch screen
- Embedded web pages for display on a PC
- Remote display of operator screens via app on tablet

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>400 V/20 kVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>2010 x 1000 x 400 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>250 kg</td>
</tr>
</tbody>
</table>

Main industries
- Electrotechnical engineering
- Energy engineering

Benefits
- Full integration of RT2012 requirements
- New generation digitized LV switchboard
- Energy-efficient control

To order
MD1AA790SP SMART PANEL energy management switchboard

MD1AA790SP SMART PANEL energy management switchboard

Benefits
- Full integration of RT2012 requirements
- New generation digitized LV switchboard
- Energy-efficient control

To order
MD1AA790SP SMART PANEL energy management switchboard
Learning objectives

- To set heating and lighting programs
- To use Modbus, Ethernet TCP/IP and KNX communication protocols
- To study the lighting requirements of the RT2012 standard:
  - lighting control
  - monitoring lighting controls
- To study the heating requirements of the RT2012 standard (refresher):
  - heating control
  - monitoring heat settings
- To study the metering requirements of the RT2012 standard:
  - measuring energy consumption

Main industries

- Electrical engineering
- Electrotechnical engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>400 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>930 x 600 x 250 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>30 kg</td>
</tr>
</tbody>
</table>

Description

MD1AA665ECL lighting cabinet
- 1 Prisma Plus enclosure with transparent door
- 1 smart meter
- 4 Reflex integrated control circuit breakers
- 1 emergency stop on the side of the cabinet
- 4 lighting zones
- 3 light banks in parallel for each lighting zone
- Timer programs in the LV switchboard

MD1AA665CH heating cabinet
- 1 Prisma Plus enclosure with transparent door
- 1 smart meter
- 1 Ethernet/KNX gateway
- 1 touch screen for local control
- 1 thermostat (for installation indoors)
- 1 temperature and light level sensor (for installation outdoors)
- 1 temperature, CO2 and humidity sensor (for installation indoors)
- 1 emergency stop on the side of the cabinet
- 1 two-tone tower light
- 4 regulated zones + 1 non-regulated zone

Presentation

These heating and lighting cabinets are designed to learn how to control, monitor and measure the energy consumption as described in the French energy efficiency standard RT2012. They feed information back to the teaching LV switchboard via Ethernet TCP/IP or Modbus. The heating cabinet is used to set heating programs with a DICTALIS LV switchboard.

Benefits

- Compatible with all Ethernet TCP/IP/Modbus LV switchboards
- Scalable Ethernet architecture
- Heating cabinet can be controlled remotely on a tablet

To order

<table>
<thead>
<tr>
<th>MD1AA665ECL</th>
<th>Lighting cabinet for RT2012 compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AA665CH</td>
<td>KNX heating cabinet for RT2012 compliance</td>
</tr>
</tbody>
</table>
Cabinets for upgrading LV switchboards to energy management switchboards
IRIO cabinet + analog and digital interface cabinet

**Learning objectives**
- To manage an installation remotely
- To use the energy management switchboard functions:
  - concentrating and storing data/measurements
  - simple mathematical calculations
  - detecting and timestamping alarms
  - simple load management
  - publishing data
  - dashboards configured according to customer requirements
- To monitor and analyze energy consumption
- To apply the requirements of the French energy efficiency standard RT2012

**Presentation**
The IRIO cabinet is installed near an existing LV switchboard. It is used to transform an LV switchboard into an energy management switchboard by taking energy measurements on the various feeders.

**Description**

**IRIO controller cabinet**
- 1 IRIO controller
- 1 Ethernet/Zigbee gateway
- 1 switch
- Necessary protection devices

**Kit for measuring 6 LV switchboard feeders**
- 1 Zigbee communication module
- 1 DC power supply
- 6 energy meters:
  - 3 single-phase meters
  - 3 three-phase meters

The Zigbee communication module is installed in the LV switchboard. It is used to feed information back to the controller cabinet. Energy meters should be installed on each of the LV switchboard feeders to be controlled.

**Analog and digital interface cabinet**
- 1 M221 PLC with 9 x 24 DC inputs, 7 relay outputs, 2 inputs + 4 outputs (0-10 V analog) and 1 Ethernet port
- 1 x 24 VDC 3 A power supply
- 2 circuit breakers
- 1 voltage presence indicator
- 1 RJ45/RJ45 cable (5 m)

**Main industries**
- Electrical engineering
- Electrotechnical engineering

**Characteristics**

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Dimensions (H x W x D)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>230 V</td>
<td>IRIO controller cabinet</td>
<td>0.2 kg</td>
</tr>
<tr>
<td>300 x 400 x 200 mm</td>
<td>Analog/digital interface cabinet</td>
<td>3 kg</td>
</tr>
</tbody>
</table>

**Benefits**
- Can be adapted to any LV switchboard
- No wiring between the LV switchboard and the IRIO cabinet

**To order**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDGIRIOCC</td>
<td>IRIO controller cabinet</td>
</tr>
<tr>
<td>MDGIRIOME</td>
<td>IRIO measuring kit</td>
</tr>
<tr>
<td>MT1AA6651NT</td>
<td>Analog and digital interface cabinet</td>
</tr>
</tbody>
</table>
IT system cabinet and secondary distribution boards

Learning objectives

- To create an IT electrical supply system
- To grasp the principle of continuity of service for an installation as well as the associated maintenance methods
- To implement an IT earthing system (neutral isolated from earth)
- To establish connections with a communicating LV switchboard cabinet to be able to complete the possible workshop architectures

Presentation

This mobile cabinet is used to replicate an IT system on a dedicated teaching platform. It is designed to demonstrate the principle of continuity of service for an installation as well as the associated maintenance methods.

The system distribution board is used to protect power supplies on industrial systems (machines, operative parts, etc.). The commercial distribution board is used to protect power supplies on commercial systems (lighting, socket outlets, etc.). The status of the different feeders is centralized on Twido PLCs. Data is sent via the Ethernet network to a concentrator PLC in an LV switchboard.

Main industries

- Electrical engineering
- Electrotechnical engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>IT system cabinet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>400 V/10 kVA</td>
</tr>
<tr>
<td>Weight</td>
<td>1540 x 800 x 590 mm</td>
</tr>
<tr>
<td></td>
<td>203 kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Distribution board</th>
<th>System distribution board</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>400 V/23 kVA</td>
</tr>
<tr>
<td>Weight</td>
<td>645 x 480 x 250 mm</td>
</tr>
<tr>
<td></td>
<td>18 kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>System or commercial distribution board</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Data is sent via the Ethernet network to a concentrator PLC in an LV switchboard.</td>
<td></td>
</tr>
</tbody>
</table>

Description

**IT system cabinet**
- Electrical distribution cabinet on 4 locking castors
- 1 x 400 V/230-400 V 10 kVA three-phase transformer
- 3 three-phase feeders protected by 10 A circuit breakers
- 1 IM20 permanent insulation monitor (PIM)
- 1 Twido PLC

**System distribution board**
- Prisma Plus modular switchgear enclosure
- 1 master switch
- Padlockable external handle
- 2 x 2-pole circuit breakers
- 4 x 3-pole circuit breakers
- 1 Twido PLC

**Commercial distribution board**
- Prisma Plus modular switchgear cabinet
- 1 master switch
- Padlockable external handle
- 6 x 2-pole circuit breakers
- 1 Twido PLC

Benefits

- Compact, mobile IT system cabinet
- 3 three-phase feeders for connecting various devices
- Distribution boards communicating via Ethernet with an LV switchboard

To order

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AA700TIT</td>
<td>IT system cabinet</td>
</tr>
<tr>
<td>MD1AA700TDS</td>
<td>System distribution board</td>
</tr>
<tr>
<td>MD1AA700TDT</td>
<td>Commercial distribution board</td>
</tr>
</tbody>
</table>
Distribution

IT system enclosure for hospital environment

Learning objectives
- To explain earthing systems and the isolated neutral
- To commission the IT system enclosure
- To connect a feeder for measurement purposes
- To locate insulation faults manually or automatically
- To connect an RCD to a feeder
- To set the parameters of a permanent insulation monitor
- To set the communication system parameters (Ethernet)
- To use the ETG100 module web pages with fault reports

Main industries
- Electrical engineering
- Industrial maintenance

Characteristics

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power supply</strong></td>
<td>400 V/10 kVA</td>
</tr>
<tr>
<td><strong>Dimensions (H x W x D)</strong></td>
<td>2200 x 850 x 450 mm</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>200 kg</td>
</tr>
</tbody>
</table>

Presentation

The IT system enclosure is designed to demonstrate and implement a specific IT system application. Hospitals require a high level of continuity of service in operating theatres.

Operating data is fed back in real time to a supervisory program intended for use by medical and maintenance personnel.

This product is used to simulate insulation or short-circuit faults as well as mains voltage drops.

Description

- 1 Prisma P cubicle
- 1 x 400 V/400 V 10 kVA transformer with star-delta connection
- 6 feeders for protecting electronic circuits
- Mimic panel:
  - wiring diagram of cubicle
  - 6 feeders with measuring points
- Cables required for use
- System for simulating faults on 5 feeders (selection via switch)
- System for simulating a second fault, short-circuit current limiting
- Communicating permanent insulation monitor with automatic fault location
- Source changeover for simulating loss of voltage and automatic changeover to a backup power source

Available as an option
Three-phase UPS with 10 minute independent operation

Benefits
- Same equipment as used in hospitals
- System originating from Schneider Electric's dedicated medical solutions range
- Communicating equipment

To order

<table>
<thead>
<tr>
<th>MD1AA710</th>
<th>Medical IT enclosure</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AA719</td>
<td>Three-phase UPS option</td>
</tr>
</tbody>
</table>
Distribution

Earthing systems bench

Learning objectives
- To study the different earthing systems: TN, TT and IT
- To apply the protection standards for LV electrical distribution to each type of earthing system
- To learn how to locate faults

Presentation
This bench is designed for studying the different earthing systems. It has 2 working sides:
- one side to study the TN and TT neutral earthing systems
- one side to study the IT neutral earthing system

Receivers are simulated by loads installed in the lower part of the bench. The IM400 version is used for automatic fault location. The IM20 version is used for manual fault location.

Main industries
- Electrical engineering
- Industrial maintenance

Characteristics

<table>
<thead>
<tr>
<th></th>
<th>400 V/4 kVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td></td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>1950 x 770 x 600 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>152 kg</td>
</tr>
</tbody>
</table>

Description
The bench is mounted on a frame with locking castors. Each side comprises:
- 1 mimic diagram of the distribution architecture
- 3 single or three-phase receivers representing a person
- Protection via thermal-magnetic circuit breakers and RCBOs
- Residual current circuit breakers and contactors
- 1 permanent insulation monitor for IT system (IM400 or IM20)
- Built-in XD301 detectors on the IM400 version
- In the lower part:
  - power resistors
  - power transformer
  - 1 set of safety leads included

Fault location kit for version IM20
- XP15 current probe
- 1 XGR leakage current generator
- 1 XRM mobile receiver

Benefits
- Both sides can be used simultaneously
- Only 1 piece of equipment required for all 3 earthing systems
- Safe, rugged wiring

To order

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDG99603</td>
<td>Earthing system bench - IM400 version</td>
</tr>
<tr>
<td>MDG99605</td>
<td>Earthing system bench - IM20 version</td>
</tr>
<tr>
<td>MDG99609</td>
<td>Fault location kit for IM20</td>
</tr>
</tbody>
</table>
Protection discrimination bench

**Learning objectives**
- To use an adjustable residual current relay with separate current transformer
- To analyze the causes and effects of short-circuit currents
  - calculation methods
  - choice of protection devices
- To study the operating principles of a thermal-magnetic circuit breaker
  - tripping curves
  - breaking capacity
- To use and trace the tripping curve for a given rating
- To implement discrimination between upstream and downstream protection devices
- To simulate situations of total discrimination, partial discrimination and non-discrimination
- To study the concept of discrimination on 2 or 3 levels:
  - consequences and effects on an installation
- To select the earth fault loop impedance by induction coils of adjustable values
- To provide a simplified presentation of breaking by a very low voltage electric arc
- To limit the short-circuit current

**Presentation**
This bench is designed to study and implement two discrimination strategies - current discrimination and time discrimination - for protection devices in low voltage distribution systems. Two isolation transformers are used to limit the energy involved when forcing the faults necessary for the purposes of study.

**Description**
The bench is mounted on a frame with locking castors. It features:
- 2 mimic panels:
  - current discrimination
  - time discrimination
- Circuit breakers with different tripping curves (B, C or D)
- 2 x 220 V/48 V isolation transformers on the lower part
- 1 set of induction coils (for current discrimination)
- 1 rheostat (for time discrimination)
- 1 safety device to open the protection panels
- 1 set of safety leads included

**Main industries**
- Electrical engineering
- Industrial maintenance

**Characteristics**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>230 V/3.2 kVA</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>1850 x 730 x 620 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>150 kg</td>
</tr>
</tbody>
</table>

**Benefits**
- Both sides can be used simultaneously
- Only 1 piece of equipment required for both discrimination types
- Safe, rugged wiring

**To order**

MDG99610 | Discrimination bench
Energy infrastructure

Power quality
Energy infrastructure

Power quality

- Reactive power factor correction ............................................. page 34
- Electromechanical interference ................................................ page 35
- Harmonic interference:
  - HARMOTRIS ........................................................................ page 36
  - MINHARMOTRIS ................................................................. page 37
**Learning objectives**
- To measure the phase shift factor on linear and non-linear loads:
  - Influence of line length
  - Solutions for correcting the phase shift factor
- To highlight, measure and reduce inrush currents associated with capacitor activation
- To highlight the overloads on capacitors (anti-resonance) associated with harmonic phenomena
- To implement appropriate solutions

**Main industry**
- Electrical engineering

**Characteristics**

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power supply</strong></td>
</tr>
<tr>
<td>230 V/3.2 kVA</td>
</tr>
<tr>
<td><strong>Dimensions (H x W x D)</strong></td>
</tr>
<tr>
<td>Control cabinet: 950 x 700 x 370 mm, 70 kg</td>
</tr>
<tr>
<td>Lamp cabinet: 420 x 800 x 300 mm, 18 kg</td>
</tr>
</tbody>
</table>

**Presentation**

This cabinet represents a reactive power factor correction installation. It includes the following functions:
- Phase-shifted linear loads for varying the installation phase shift factor
- A varmeter measurement system
- A reactive power factor correction system performed by capacitor steps controlled by the power factor relay
- A solid state contactor to limit the capacitor inrush current
- A non-linear load system to highlight anti-resonance phenomena from harmonics circulating in the capacitors
- A correcting device with an anti-resonance reactor

**Note**

Measurements and practical exercises require the use of a universal RMS controller or special instruments such as harmonics analyzers.

**Description**

**Control cabinet**
- 1 mimic panel
- 1 VARLOGIC measurement system
- 1 set of 3 capacitors
- 1 set of 3 induction coils
- Measuring points on the right-hand side

**Lamp cabinet**
- 3 x 500 W halogen lamps controlled by a dimmer switch

**Benefits**
- Compact system for studying reactive power factor correction
- Applications in applied physics
- Safe measuring points

**To order**

| MDG99160 | Reactive power factor correction cabinet + lamp cabinet |
| MDG99169 | Optional trolley |

Control cabinet

Lamp cabinet
Power quality

Electromagnetic interference

HARMOCEM

Learning objectives

- To identify the harmonics generated by different receivers
- To identify interference caused by the coexistence of power and data signals (EMC)
- To measure radiated and conducted emissions
- To implement appropriate solutions in accordance with the relevant wiring regulations

Presentation

The HARMOCEM package consists of two cabinets for replicating the electromagnetic interference phenomena encountered in industrial environments and assessing the performance of the various solutions. An active filter is available as an option to complement the study of anti-harmonics solutions. Measurements and practical exercises require the use of a spectrum analyzer (HF) and a harmonics analyzer (LF).

Description

The HARMOCEM bench comprises 2 cabinets.

Control cabinet

- Mimic diagram with selection of components to be used for the relevant solution
- 1 set of 3 induction coils
- 1 set of 3 capacitors
- Variable speed drive
- Filters, compensators, induction coils, capacitors
- Measuring points

Load cabinet

- Non-linear loads: dimmer switches, bulbs, fluorescent tubes, etc.
- 1 loaded asynchronous motor
- Leads and probes

Available as an option

- 1 trolley with lockable drawer for the control cabinet and active filter
- 1 trolley for the load cabinet
- Active filter:
  - power supplied via control cabinet
  - fast connection via double-recess connectors
  - 2 A maximum compensation current
  - compensation of 2nd to 25th harmonic
- HF spectrum analyzer:
  - for frequencies from 150 kHz to 1 GHz
- Single-phase LF analyzer:
  - for measuring 2nd to 50th harmonic

Benefits

- Applications in applied physics
- Safe measuring points

Main industry

- Electrical engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/1.5 kVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>810 x 700 x 350 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>60 kg</td>
</tr>
<tr>
<td>Load cabinet</td>
<td>750 x 700 x 330 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>42 kg</td>
</tr>
<tr>
<td>Active filter option</td>
<td>225 x 340 x 340 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>8 kg</td>
</tr>
</tbody>
</table>

To order

- MDG99150: HARMOCEM bench
- MDG99158: Trolleys
- MDG99159: Active filter
- MDG99198: HF spectrum analyzer
- MDG99098H: Single-phase LF analyzer
Harmonic interference
HARMOTRIS

Learning objectives
● To study problems of interference on a three-phase installation
● To analyze the phenomena of harmonics, EMC and temperature rise on the neutral conductor
● To implement appropriate solutions

Main industry
● Electrical engineering

Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The HARMOTRIS bench consists of an electrical cabinet and a cabinet containing the lighting loads. The electrical architecture simulates a theatre installation. It has 2 separate power lines to control a lighting circuit and activate motor-driven scenery. Measurements and practical exercises require the use of a spectrum analyzer (HF) and a harmonics analyzer (LF).</td>
<td></td>
</tr>
</tbody>
</table>

Power supply
| 400 V/3.3 kVA |

Dimensions (H x W x D)
| 1860 x 900 x 570 mm |

Weight
| 230 kg |

To order

<table>
<thead>
<tr>
<th>MDG99190</th>
<th>HARMOTRIS bench</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDG99159</td>
<td>Active filter</td>
</tr>
<tr>
<td>MDG99198</td>
<td>HF spectrum analyzer</td>
</tr>
<tr>
<td>MDG99099H</td>
<td>Three-phase LF analyzer</td>
</tr>
</tbody>
</table>

Benefits
● Applicable to industrial and commercial installations
● Mobile equipment
● Safe measuring points

Inside of cabinet
Harmonic interference
MINHARMOTRIS

Learning objectives
- To display and interpret harmonic interference on an electrical installation
- To analyze the phenomena of 3rd order harmonics and temperature rise on the neutral conductor
- To implement the appropriate solution with a harmonic filter
- To study the influence of conductor cross-section and apply the relevant standards
- To study a lightning arrester

Main industry
- Electrical engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>400 V/1.2 kVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>1150 x 900 x 450 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>80 kg</td>
</tr>
</tbody>
</table>

Presentation
The MINHARMOTRIS bench consists of an electrical cabinet containing a power line for a lighting circuit. It is designed to provide a simple means of demonstrating the problems associated with harmonic interference.

Description
- Electrical cabinet
- 1 bank of halogen lamps
- 1 bank of fluorescent, compact fluorescent or induction lamps
- 1 transformer
- 1 set of induction coils and 1 set of capacitors “on 2 rows”
- Circuit breakers
- Lightning protection device
- Lamp selection and adjustment panel
- A bank of measuring points
- Cabinet cooling device

Available as an option
- Trolley for the MINHARMOTRIS cabinet
- Three-phase LF analyzer: see page 36

Benefits
- Applications in applied physics
- Simple analysis of the 3rd harmonic
- Safe measuring points

To order
- MDG99195 MINHARMOTRIS cabinet
- MDG99199 MINHARMOTRIS trolley
- MDG99099H Three-phase LF analyzer
Energy infrastructure

Renewable energy
<table>
<thead>
<tr>
<th>Energy infrastructure</th>
<th>Renewable energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar power modular offer</td>
<td>page 40</td>
</tr>
<tr>
<td>Renewable energy generation</td>
<td>page 41</td>
</tr>
<tr>
<td>Operative parts for renewable energy bench</td>
<td>page 42</td>
</tr>
<tr>
<td>Solar potential</td>
<td>page 43</td>
</tr>
<tr>
<td>Micro solar power plant</td>
<td>page 44</td>
</tr>
<tr>
<td>PV-wind turbine system for remote sites</td>
<td>page 45</td>
</tr>
<tr>
<td>Photovoltaic characterization bench</td>
<td>page 46</td>
</tr>
<tr>
<td>Solar-powered water extraction</td>
<td>page 47</td>
</tr>
<tr>
<td>Tube solar water heater</td>
<td>page 48</td>
</tr>
<tr>
<td>Solar water heating system</td>
<td>page 49</td>
</tr>
<tr>
<td>Hydroelectric power bench</td>
<td>page 50</td>
</tr>
</tbody>
</table>
# Renewable energy

## Solar power modular offer

### Learning objectives
- To learn about and identify the components
- To study, size and install solar panels
- To study the effect of shading masks

### Main industries
- Electrical engineering
- Industrial technology

### Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>Qty</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support frame</td>
<td>1</td>
<td>MD1AM000</td>
</tr>
<tr>
<td>Solar panel</td>
<td>1</td>
<td>MD1AMS005</td>
</tr>
<tr>
<td>Measurement module with 1 voltmeter and 1 ammeter</td>
<td>1</td>
<td>MD1AMS001</td>
</tr>
<tr>
<td>Charge regulator module equipped with 2 indicators</td>
<td>1</td>
<td>MD1AMS002</td>
</tr>
<tr>
<td>12 V battery module</td>
<td>1</td>
<td>MD1AMS003</td>
</tr>
<tr>
<td>12 VDC/230 VAC inverter module</td>
<td>1</td>
<td>MD1AMS004</td>
</tr>
<tr>
<td>15 W lamp holder module</td>
<td>1</td>
<td>MD1AMP004</td>
</tr>
</tbody>
</table>

### Composition

The MD1AMLSOL global offer consists of the modules below. You can also order each module separately according to requirements.

### Dimensions (H x W x D)

- **Frame**: 1030 x 910 x 400 mm, 6.5 kg
- **Modules**: 70 x 150 x 245 mm, 0.7 kg

### Weight

- **Frame**: 6.5 kg
- **Modules**: 0.7 kg

### Composition

This solar modular offer is designed to demonstrate the basics of energy production by solar panels. To display the charging status, the regulator module is equipped with 2 indicators: green for battery charged and red for battery charging.

### Presentation

- To learn about and identify the components
- To study, size and install solar panels
- To study the effect of shading masks

### Benefits
- Introduction to solar power
- Prototyping of an energy system
- Quick, safe setup

### To order

**MD1AMLSOL** | Solar power modular offer
Renewable energy generation
Renewable energy bench

Learning objectives
- To implement different combinations of electricity generation and storage methods
- To use an electricity storage device
- To study the regulator function
- To learn about the inverter function
- To compare generation from fixed PV panels and solar tracker systems
- To learn about wind turbines

Presentation
This bench is designed to aid the study and comparison of different sources of renewable energy such as photovoltaic panels and wind turbines. It is used to study the conversion of DC to AC power, with or without storage of energy by batteries. The renewable energy sources come in the form of actual operative parts (see page 42). They can also be simulated by a variable DC power supply to overcome weather conditions and study all possible scenarios.

Description

Basic version
- 1 PLC for managing the generation, storage and consumption sequences
- 1 display unit for displaying the electrical U/I/P values
- 1 inverter for remote sites
- 230 V and 24 V lamp loads, or external load
The versions below also include the following additional functions:

Versions with simulation
- 1 variable DC power supply controlled by PLC for simulating generation of the various renewable energies

Version with storage:
- 1 set of 24 V/27 Ah lead batteries with charger

Version with simulation and storage:
- 1 programmable power supply and storage batteries

Operative parts available as an option
See page 42

To order

| MDG99400  | Basic renewable energy bench |
| MDG99401  | Renewable energy bench with simulated power supply |
| MDG99402  | Renewable energy bench with storage batteries |
| MDG99403  | Renewable energy bench with simulated power supply and batteries |

Main industry
- Electrical engineering

Characteristics

| Power supply    | 230 V          |
| Dimensions (H x W x D) | 1255 x 880 x 625 mm |
| Weight          | 150 kg         |

Benefits
- Operation possible in simulation mode
- Numerous different configurations
- Remote monitoring possible via app on tablet

Educational Solutions Catalogue - 2015/2016
Renewable energy
Operative parts for renewable energy bench

Learning objectives
- To implement different combinations of electricity generation and storage methods
- To use an electricity storage device
- To study the regulator function
- To learn how the inverter works
- To compare generation from fixed PV panels and solar tracker systems
- To learn how wind turbines work

Presentation
The operative parts available in this offer are designed to supply renewable energy for the renewable energy bench (see page 41). The solar tracker can be used independently.

Description
Fixed PV panels
- 1 fixed aluminium frame, with adjustable tilt mechanism
- 2 x 140 Wc PV panels (1360 x 1510 mm)
- Cable and connector for connection to the renewable energy bench

Solar tracker
- 1 mobile frame with stand (1200 x 1200 mm), height 2.0-2.3 m
- 2 x 140 Wc PV panels (1360 x 1510 mm)
- 1 tracker control box
- 1 PLC cabinet for control
- Cable and connector for connection to the renewable energy bench

Mechanically-driven wind turbine bench
- 1 x 24 VDC/300 W wind turbine (wind speed 2-20 m/s)
- 1 motor controlled by an Altivar variable speed drive
- Cable and connector for connection to the renewable energy bench

Wind turbine (to be mounted on a pole)
- 1 single-phase 24 VDC wind turbine, blade diameter 1 m (pole not included)

Characteristics

<table>
<thead>
<tr>
<th>Dimensions (H x W x D)</th>
<th>Fixed PV panels</th>
<th>Solar tracker</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>1360 x 2770 x 1510 mm</td>
<td>2300 x 2720 x 400 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>30 kg</td>
<td>75 kg</td>
</tr>
</tbody>
</table>

To order

- MDG99410: OP for renewable energy bench: PV panels
- MDG99420: OP for renewable energy bench: solar tracker
- MDG99430: OP for renewable energy bench: wind turbine bench
- MDG99440: OP for renewable energy bench: wind turbine for pole-mounting
Solar potential
Solar potential analyzer

Learning objectives
- To learn about the characteristics of photovoltaic solar panels: I(V), MPPT, Voc, Isc, wired in series/parallel
- To analyze a site’s solar potential
- To study a site’s electricity generation/consumption
- To calculate the energy generation system
- To size a solar photovoltaic installation
- To be aware of the economic data for renewable energy
- To create a monitoring interface in LabVIEW

Presentation
This package combines solar potential analyzer simulation software with a case for studying the main electrical characteristics of a solar panel. It is used to provide an insight into orders of magnitude and the principles of sizing for a solar photovoltaic installation. The equipment is made by Soleïs Technologie and marketed by Schneider Electric.

Description
Solar potential analyzer software
This software simulates electricity generation in a solar photovoltaic installation in real time and includes:
- A technical, meteorological and financial database
- Algorithms for calculating output and ROI

Case
- 1 x 25 W monocrystalline solar photovoltaic panel with MC4 connectors
- Electronic sensors:
  - tilt
  - temperature
  - compass
  - GPS
- 1 electronic data acquisition card for sensor data

Main industries
- Energy engineering
- Energy engineering

Characteristics

<table>
<thead>
<tr>
<th>Dimensions (H x W x D)</th>
<th>560 x 560 x 70 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>7.4 kg</td>
</tr>
</tbody>
</table>

Recommended configuration
- Windows XP, Vista, 7 32-bit and 64-bit
- 1 USB port

To order

<table>
<thead>
<tr>
<th>MDGAGSLE</th>
<th>Solar potential analyzer software (with academic site license)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDGAGSVAL</td>
<td>PV case for solar potential analysis</td>
</tr>
</tbody>
</table>

Benefits
- Quick installation of equipment (in just a few minutes)
- Intuitive user interface - no training required
- LabVIEW DLL and application examples included
Renewable energy

Micro solar power plant

Learning objectives

- To understand the electrical characteristics of a solar photovoltaic panel:
  - I(V) characterization
  - MPPT
  - Voc, Isc
- To optimize energy generation:
  - Influence of panel position (direction, tilt, shading masks)
  - Influence of panel wiring (in series/in parallel)
- To protect a micro photovoltaic power plant

Presentation

The micro solar power plant is used to teach students about solar photovoltaic technologies, from understanding the electrical characteristics to how to optimize photovoltaic energy generation. The combination of 3 micro PV power plants offers a wider range of wiring options, voltages (from 3.8 V to 23 V (Voc)) and currents (from 8.5 A to 50 A (Isc)). The equipment is made by Soleïs Technologie and marketed by Schneider Electric.

Main industries

- Electrical engineering
- Energy engineering
- Energy engineering

Characteristics

<table>
<thead>
<tr>
<th>Dimensions (H x W x D)</th>
<th>810 x 800 x 580 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>9 kg</td>
</tr>
</tbody>
</table>

Description

1 micro PV power plant
- 1 mobile tiltable frame
- 2 x 25 Wc crystalline silicon solar photovoltaic panels
- 1 compass
- 1 set of MC4/double-recess connector electrical leads

Set of 3 micro PV power plants
- 3 x list above
- 3 boxes of diodes for connecting the 3 micro power plants

Benefits

- Practical, rugged portable tool
- No infrastructure required
- Quick installation and arrangement (in just a few minutes)

To order

<table>
<thead>
<tr>
<th>MDGMCPV</th>
<th>Micro PV power plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDG3MCPV</td>
<td>Set of 3 micro PV power plants</td>
</tr>
</tbody>
</table>

Micro power plant x 3
Renewable energy

PV-wind turbine system for remote sites
SOLEOLIS

Learning objectives
- To identify the equipment
- To control the system and use the web pages
- To study and size a combined solar and wind turbine installation
- To study energy transfer and calculate the stored power depending on the battery configuration
- To measure and compare PV and wind turbine performance

Main industries
- Electrical engineering
- Industrial maintenance

Characteristics

| Description |
|---|---|
| Power supply | 230 V/200 VA |
| Dimensions (H x W x D) | 1320 x 770 x 1700 mm |
| Weight | 130 kg |

Presentation
This product is designed to demonstrate the renewable energy generation capability of solar panels and/or wind turbines for remote sites. The electrical energy stored in the batteries is used to power an external device (230 V/1 A maximum). The wind turbine is driven by an asynchronous motor with a variable speed drive to simulate different wind strengths. A PLC monitors the battery charge status and switches back to the mains power supply if necessary.

Description
- Aluminium frame on castors
- 1 electrical cabinet with mimic panel
- Multi-position PV panel approximately 1 m²
- 1 x 450 Wc wind turbine driven by asynchronous motor
- 2 x 12 V gel cell lead acid batteries
- 1 x 24 V battery charger
- 1 regulator
- 1 x 24 V/230 V inverter for remote sites
- 1 Twido PLC
- 1 Magelis operator dialogue terminal for control and displaying measurements
- 1 Ethernet module with web server
- Control and protection components

Benefits
- Compact wind turbine and PV equipment
- Controllable locally and via school/college LAN
- Option to use the wind turbine outdoors

To order
MDG99215 | SOLEOLIS system
### Renewable energy

#### Photovoltaic characterization bench

**Solar potential analysis PRO**

---

**Learning objectives**
- To study different solar PV panel technologies: monocrystalline, CIGS and amorphous
- To compare the performance of the different PV panel types over time (measurements taken continuously)
- To compare the efficiency of a fixed installation with that of a tracker installation
- To study the influence of solar potential (radiation, temperature, shading) for each technology

**Main industries**
- Electrotechnical engineering
- Automation engineering
- Vocational degrees
- Masters in renewable energies
- Engineering colleges
- Professional training centres

**Characteristics**

<table>
<thead>
<tr>
<th>Dimensions (H x W x D)</th>
<th>1900 x 5000 x 1500 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>440 kg (including 150 kg ballast)</td>
</tr>
</tbody>
</table>

**Description**

The solar potential analysis PRO bench consists of 4 monocrystalline Si, CIGS and amorphous Si panels. These types can be modified on request.

- 3 PV panels are mounted on a fixed frame.
- 1 PV panel is mounted on a tracker.
- The panels are equipped with a temperature sensor and connected to a variable load for I(V) characterization and MPPT.

The equipment is made by Soleis Technologie and marketed by Schneider Electric.

**Presentation**

The solar potential analysis PRO bench is used to study and compare different solar photovoltaic panel technologies on different mountings (fixed frame and solar tracker). Measurements (temperature, irradiance, voltage, current, etc.) are taken from each panel every second, averaged out per minute and then stored. This data is emailed through every night. It is then formatted, analyzed and studied with the students. The equipment is made by Soleis Technologie and marketed by Schneider Electric.

**To order**

**MDGAGSTRK** Solar potential analysis PRO PV bench with tracker

**MDGAGSANE** Anemometer option

---

**Benefits**
- Option to choose PV technologies on request
- Self-sufficient energy bench
- Automatic data collection and transmission via GPRS GSM link

---

**To order**

**MDGAGSTRK** Solar potential analysis PRO PV bench with tracker

**MDGAGSANE** Anemometer option
**Renewable energy**

**Solar-powered water extraction**

**Instrumented SOLAR WATER**

---

**Learning objectives**

- To learn about and substantiate the concept of stand-alone solar water pumping systems
- To identify the energy flows, characterize the transformations and estimate overall system efficiency
- To size the solar panels and the variable speed drive for the system
- To set the installation parameters: define the MPPT depending on the amount of sunlight

**Main industry**

- Energy engineering

**Characteristics**

<table>
<thead>
<tr>
<th>Description</th>
<th>Power supply</th>
<th>230 V/180 W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>730 x 700 x 390 mm</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>40 kg no load</td>
<td></td>
</tr>
</tbody>
</table>

**Presentation**

The instrumented SOLAR WATER bench replicates a Schneider Electric stand-alone solar-powered water pumping solution for areas where there is no electricity supply. Electricity is generated using photovoltaic panels to power a dedicated drive directly. The system operates without batteries, the purpose being to provide a continuous supply of water by ensuring the tank is sized correctly according to requirements and the daily amounts of sunlight. To facilitate use for teaching purposes, this model can be powered by a PV array with 300 VDC output, by a 24 VDC laboratory power supply, or via the AC power supply.

**Description**

- 1 x 180 W Altivar 312 Solar variable speed drive
- 1 centrifugal pump
- 1 upper tank with level sensor
- 1 lower tank simulating the water table
- 1 pump ON/OFF switch
- 1 rotary dial to vary the voltage
- 1 pump running indicator
- 1 pump error indicator
- 1 mushroom head emergency stop button
- Circuit breakers
- 1 AC power supply lead
- 1 x 24 VDC power supply connection
- 1 x 300 VDC PV panel power supply connection
- 1 x 230 VAC main power supply connection
- 1 flow sensor
- 1 pressure sensor
- 1 LabVIEW interface for data acquisition
- 1 Modbus/Ethernet gateway

---

**Benefits**

- Compact design
- Off-grid operation possible
- Use of real-life example to illustrate sustainable energy development issues

---

**To order**

MD1BPODS | Instrumented SOLAR WATER bench

---

Educational Solutions Catalogue - 2015/2016
Renewable energy

Tube solar water heater

Learning objectives
- To learn about the components of a solar water heating system
- To study heat exchanges
- To size an expansion tank
- To understand the safety issues associated with a solar water heating system
- To install, use and maintain the solar water heater
- To study temperature regulation
- To study the influence of tilt angle and sensor type

Main industries
- Energy engineering
- Electrotechnical engineering
- Energy engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/2.1 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>1350 x 1180 x 670 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>255 kg</td>
</tr>
</tbody>
</table>

Presentation

This solar water heater with electric boost is used to study how to implement a dual-energy solar water heating system.

The angle of the evacuated tube solar collector can be adjusted. The water circuit with hot water tank replicates a real-life installation with a thermostatic mixing valve to regulate water temperature.

The compact size of the equipment produces an inertia that is compatible with the learning activities.

Data from the temperature sensors and the solarimeter can be downloaded to a PC using a converter (software provided).

Description

- Frame on castors
- Solar collector with 6 evacuated tubes
- 1 x 15 L domestic hot water tank equipped with heating resistor
- 1 water circulation pump
- 1 manometer
- 1 expansion tank
- 1 relief valve
- 1 fill valve
- 1 drain valve
- 1 non-return valve
- Solenoid valves (for network separation purposes)
- 6 temperature sensors
- 1 thermostatic mixing valve
- 1 solarimeter
- M238 PLC with HMI display unit
- LabVIEW application software

Available as an option
- Industrial management software
- Floodlight heater bank on request

To order

<table>
<thead>
<tr>
<th>MD1AACHESOL</th>
<th>Evacuated tube solar water heater</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AACHEPACRV</td>
<td>Industrial management software</td>
</tr>
</tbody>
</table>

Benefits
- Fully transparent water circuit
- Ease of control via HMI
- Real-time temperature curves
**Solar water heating system**

### Learning objectives
- To study the physics of a solar water heating system
- To study the hydraulic circuit
- To study the electrical wiring circuit
- To carry out commissioning and maintenance operations
- To study the heating control system
- To interpret the following measurements:
  - thermal report
  - energy savings report

### Presentation
This solar water heater with electric boost is used to study an instrumented solar water heating system. The hydraulic circuit replicates a real-life installation with a hot water tank. Data from the temperature sensors and the solarimeter can be downloaded to a PC using a converter (software provided). This solar water heater can operate indoors when used with the heater bank available as an option. The equipment is made by ELECTRONA and marketed by Schneider Electric.

### Description
The tubular steel frames are mounted on locking castors.

#### Solar panel frame
- 2.40 m² flat panel collector, tilted at 45° angle with option to vary the angle (+5°/-15°)

#### Hydraulic circuit frame
- 200 L dual heat exchanger domestic hot water tank with 2 kW boost resistor
- Hydraulic circuit with circulation unit and expansion tank
- Electronic regulation system
- Data acquisition with communication via Internet
- Operating software

### Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Dimensions (H x W x D)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AA775</td>
<td>230 V/16 A</td>
<td></td>
</tr>
<tr>
<td>Solar panel frame</td>
<td>1600 x 1850 x 1900 mm</td>
<td>140 kg</td>
</tr>
<tr>
<td>Hydraulic frame</td>
<td>1700 x 1750 x 1000 mm</td>
<td>200 kg</td>
</tr>
<tr>
<td>Heater bank</td>
<td>1200 x 1850 x 2300 mm</td>
<td>120 kg</td>
</tr>
</tbody>
</table>

### Accessories
- Set of 20 m industrial hoses
- Heat transfer fluid (water + glycol)
- Filling pump

### Available as an option
Heater bank mounted on a frame:
- 3 x 1500 W floodlights (mounting adapted to the solar collector)
- Dimmer control for floodlights
- Protected by lockable wire mesh
- Tilting system to go through door 1.40 m x 2.10 m

### Benefits
- Actual solar water heating system with electric boost
- Mobile system in 2 parts
- Can be used indoors with the heater bank

### To order
| MD1AA775     | Solar water heating system |
| MD1AA776     | Heater bank               |
Hydroelectric power bench

HYDROLIS

Learning objectives

- To study the conversion of hydropower into electricity
- To determine the yield
- To operate an industrial multi-technology system

Main industries

- Electrical engineering
- Energy engineering
- Industrial maintenance

Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>400 V/5 kVA</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>1750 x 1500 x 750 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>200 kg empty/350 kg full</td>
</tr>
</tbody>
</table>

Presentation

The HYDROLIS bench replicates a hydroelectric power plant. It is designed to demonstrate and control the generation of electricity using hydropower. The water head can be varied from 10 to 25 m using a pump driven by a variable speed drive. A Twido or M340 PLC is used to manage the control system. The equipment is made by BEMA and marketed by Schneider Electric.

Description

Water storage and water head system
- 1 x 150 L (approx.) tank
- 1 stainless steel motor-driven pump
- 1 electrical cabinet with an Altivar 312 variable speed drive on CANopen bus with protection device
- Hydraulic circuit with drain valve

Hydropower plant
- 1 TURGO turbine with 20 buckets
- 2 water injection nozzles with flow valves
- 1 asynchronous generator with encoder for speed control
- Hydraulic circuit with analog flow and pressure sensors

Electrical cabinet
- 1 user socket
- 1 controllable capacitor bank
- 1 PM750 power meter with 3 CTs
- 1 Twido or M340 PLC with TCP/IP and CANopen
- 1 Magelis XBTGT touchscreen graphic operator dialogue terminal
- 1 voltage regulator (for energy recovery and creation of three-phase supply)
- Components required for correct, safe operation
- PCVUE monitoring of 25 variables

Available as an option
- PCVUE monitoring of 250 variables
- EDF metering solution comprising 2 meters for generation and non-consumption data

Benefits

- Display of turbine operation
- Separation of the electric pumping/turbine sections
- Measurement and control by HMI and power meter

To order

<table>
<thead>
<tr>
<th>MD1HYDROTW</th>
<th>HYDROLIS with Twido PLC</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1HYDROM340</td>
<td>HYDROLIS with M340 PLC</td>
</tr>
<tr>
<td>MD1HYDSPV25</td>
<td>HYDROLIS monitoring of 250 variables</td>
</tr>
<tr>
<td>MD1HYDCPTEDF</td>
<td>EDF meter</td>
</tr>
<tr>
<td>MD1HYDFORM</td>
<td>HYDROLIS on-site customer training day</td>
</tr>
</tbody>
</table>
Energy infrastructure

Electric vehicles
Energy infrastructure

Electric vehicles

EV charging station adapted for training purposes ............... page 54
Installing an EV charging station ........................................ page 55
EV charging station (automotive disciplines) ...................... page 56
Electric vehicles

EV charging station adapted for training purposes

Learning objectives
- To learn about the different EV charging methods
- To learn about the different types of connection
- To learn about the standards relating to EV charging stations
- To conduct a SysML study of the functions of a charging station
- To study the public infrastructure required
- To work in the LabVIEW application when connected to the charging station or in accelerated simulation mode to:
  - analyze the charging cycle (time, cost, energy)
  - analyze the voltage/current phase shift
  - analyze the harmonics
  - analyze the PWM signals to control charging

Presentation
This 3 kW charging station has been adapted for training purposes and is used to demonstrate the specifics of charging electric vehicles (EV). The charging station is equipped with a T3 connector and can therefore operate with a real EV, however it can also be used to charge a light EV such as the Renault Twizy, or an electric bike, or even to take a payment.

It features a protection unit and a vehicle presence simulation unit. A data acquisition module is used to feed information back to the LabVIEW application.

Description
- 3 kW floor standing EV charging station equipped with:
  - aluminium frame on castors
  - 1 T3 connector
  - 1 RFID badge reader with set of 10 badges
  - voltage and current sensors
  - 1 National Instrument data acquisition module
  - 1 protection unit with circuit breakers (for protecting the power meter and Ethernet gateway-web server connections)
  - 1 vehicle presence simulation unit
  - 1 T1 connector
  - 3 x 16 A + E sockets
  - Mains cable provided with industrial 32 A socket
  - Charging cable with T1 and T3 connectors
  - LabVIEW self-extracting executable file
  - POWER LOGIC software for the power meter

Main industries
- Sustainable development and environment engineering
- Electrotechnical engineering

Characteristics

| Power supply | 230 V/3 kW |
| Dimensions (H x W x D) | 1500 x 400 x 300 mm |
| Weight | 50 kg |

Benefits
- Actual charging of an electric vehicle
- Simulation of charging station operation on a PC
- Analysis of charging infrastructure norms and standards

To order

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDGVE100</td>
<td>EV charging station adapted for training purposes</td>
</tr>
<tr>
<td>MDGVE100BM</td>
<td>Biometric switch</td>
</tr>
</tbody>
</table>
Electric vehicles

Installing an EV charging station

Learning objectives

● To learn about the equipment
● To install a charging station and apply the relevant installation guidelines
● To size the protection devices
● To calculate the size of the power cables
● To commission the equipment
● To set the PLC IP address
● To install the monitoring display unit in an LV switchboard

Main industry

● Electrical engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/3 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>1175 x 360 x 222 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>35 kg</td>
</tr>
</tbody>
</table>

Presentation

This EV charging station is supplied ready for installation and connection as part of an educational project with the students. It is a floor standing model with a T3 connector and a 3 kW power rating. The protection unit and circuit breakers are to be mounted and wired. An RFID badge is used to access the charging station. An EV presence simulation unit is available as an option.

Description

● 1 x 3 kW floor standing charging station with 1 T3 connector
● 1 set of 10 RFID badges
● 1 KAEDRA weatherproof enclosure comprising:
  ○ 2 rows of 12 modules
  ○ 3 functional plates
● 1 x 2 A circuit breaker + Vigi control circuit
● 1 x 20 A circuit breaker + Vigi + MNx power circuit
● 1 x 32 A isolator with handle

Available as an option

● Frame on castors
● Professional test case with T3/T1 charging cable
● EV presence simulation unit
● STU855 operator dialogue terminal (see page 136)

Benefits

● Connection and monitoring with an LV switchboard adapted for teaching purposes
● Actual installation of a charging station
● Can be used to charge an actual EV

To order

<table>
<thead>
<tr>
<th>MDGVE050</th>
<th>Charging station (teaching version)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDGVE050CH</td>
<td>Frame on castors</td>
</tr>
<tr>
<td>MDGVE050SIM</td>
<td>Test case + T3/T1 cable</td>
</tr>
<tr>
<td>MDGVE050SIMVE</td>
<td>EV presence simulation unit</td>
</tr>
</tbody>
</table>
Electric vehicles

**EV charging station (automotive disciplines)**

**Learning objectives**
- To learn about the charging station installation process and the responsibilities
- To understand the different types of charging: slow, normal, accelerated and fast
- To learn about the different types of connectors and charging stations
- To connect a vehicle and run a charging cycle
- To determine the causes and solutions and perform first level maintenance when charging fails

**Main industries**
- Vehicle maintenance
- Electrotechnical engineering

**Characteristics**

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V single-phase/7 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>430 x 330 x 165 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>26 kg</td>
</tr>
</tbody>
</table>

**Presentation**

This wall mounted charging station for automotive disciplines is designed for charging an electric vehicle (EV) that has been adapted for teaching purposes. It allows students to familiarize themselves with the connection procedure, the charging cycle and any possible malfunctions. A heavy-duty domestic socket is also provided for connecting plug-in hybrids.

**Description**

- 1 x 7 kW wall mounted charging station with 1 T3 connector
- 1 x 14 A heavy-duty domestic socket with circuit breaker
- 1 KAEDRA weatherproof enclosure
- 1 row of 18 modules
- Power, control and protection circuit breakers to be mounted and wired
- Charging station technical documentation including mounting and wiring diagrams
- All components required for the installation are supplied with the charging station

**To order**

MDGVE010MVA  Wall mounted EV charging station  (automotive disciplines)
Building management & energy efficiency
**Building management & energy efficiency**

**Building management**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>KNX case</td>
<td>62</td>
</tr>
<tr>
<td>KNX panels</td>
<td>63</td>
</tr>
<tr>
<td>KNX mini building</td>
<td>64</td>
</tr>
<tr>
<td>CI/PRO KNX modular offer</td>
<td>65</td>
</tr>
<tr>
<td>Energy efficiency KNX modular offer</td>
<td>66</td>
</tr>
<tr>
<td>Home IO plus interface software</td>
<td>67</td>
</tr>
<tr>
<td>KNX packs</td>
<td>68</td>
</tr>
<tr>
<td>Building energy management 3D cubicles</td>
<td>69</td>
</tr>
<tr>
<td>Building energy telemetry modular offer</td>
<td>70</td>
</tr>
<tr>
<td>Energy efficiency cabinet</td>
<td>71</td>
</tr>
<tr>
<td>Electrical distribution software</td>
<td>72</td>
</tr>
</tbody>
</table>
Learning objectives
- To understand and master management of lighting and roller blinds with the KNX bus:
  - on-off lighting function
  - lighting control with dimming
  - centralized control
  - control of electric roller blinds
- To learn about the ETS 4 software tool for designing and commissioning a KNX project

Presentation
The KNX case is used to configure the basic functions of a KNX installation. The mimic diagram in the case represents an apartment with two lighting zones, and a roller blind simulated by LEDs.

Description
- 1 on-off lighting control actuator module
- 1 lighting dimmer module
- 1 roller blind module
- 1 USB/PC interface module
- 1 TCP IP interface module
- ETS5 software: 1 Lite license provided

Main industries
- Energy engineering
- Electrotechnical engineering
- Home automation

Characteristics
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>230 V/15 VA</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>150 x 460 x 340 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>5 kg</td>
</tr>
</tbody>
</table>

Benefits
- Introduction to KNX
- Quick wireless setup
- KNX application preloaded

To order
MD1AVKNX KNX case
Learning objectives
- To study the KNX bus
- To commission the equipment
- To set up functions: lighting, switching, dimming, DALI bus, presence detection, heating, blind control
- To create scenarios by combining functions
- To measure energy consumption

Main industries
- Electrical engineering
- Energy engineering
- Energy engineering

Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>Entry-level panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>230 V</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>800 x 1450 x 690 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>35 kg</td>
</tr>
</tbody>
</table>

Description
KNX panels can be used to set up a KNX installation in a commercial building. The entry-level panel represents a meeting room equipped with standard lighting and heating applications (radiator adapted for training available as an option). The expert panel represents a relaxation area with advanced KNX functions, lighting controlled via a DALI bus, presence and light level detection, blind control, and weather-related functions.

Expert panel
The expert panel needs the entry-level panel or the KNX bench in order to work.
- Simple lighting and dimming with DALI bus
- Lighting and blind regulation based on presence and light level detection
- Weather station

Available as an option
- 2 kW radiator adapted for training purposes, for connection to the entry-level panel

Benefits
- The entry-level panel can be used on its own
- Remote control using a smartphone or tablet app
- Equipment can be combined with the bench in the KNX modular offer (see pages 65 and 66)

To order
- MDGDOMKNXECA: Entry-level KNX panel
- MDGDOMKNXGSV: Expert KNX panel
- MD1AMP010: 2 kW radiator adapted for training

Presentation
KNX panels can be used to set up a KNX installation in a commercial building. The entry-level panel represents a meeting room equipped with standard lighting and heating applications (radiator adapted for training available as an option). The expert panel represents a relaxation area with advanced KNX functions, lighting controlled via a DALI bus, presence and light level detection, blind control, and weather-related functions.
KNX mini building
MINIBAT

Learning objectives
- To learn about KNX communication (address, frame, group of functions)
- To set up temperature and light level control
- To learn how to do a SysML analysis on a system
- To demonstrate the improvement the KNX network brings to lighting and heating
- To assess the power and electrical energy consumed in different scenarios

Main industries
- Energy engineering
- Electrotechnical engineering
- Automation engineering
- Electrical engineering

Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>230 V/1.75 kVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>580 x 1010 x 570 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>47 kg</td>
</tr>
</tbody>
</table>

Power supply

Roller blind
- Halogen spotlight
- KNX light sensor
- KNX switch with 4 buttons
- 100 W radiator
- Fan
- KNX thermostat with separate probe
- KNX control buttons
- External lighting
- KNX external switch
- Switchboard with protection devices
- USB connection for PC
- Wi-Fi router
- KNX connections on double-recess plugs
- 7” KNX touch screen
- ETS5 software: 1 Lite license provided

Benefits
- A single system for studying simple functions and KNX regulation
- Remote control using a tablet
- Possible expansion of the KNX bus to create mini improvement projects

Presentation
The MINIBAT bench is designed for implementing lighting and heating functions in a commercial building.
The lobby area is equipped with a roller blind controlled to ensure constant lighting. The meeting room area is equipped with a controlled fan and radiator.
A touch screen allows students to work on different operating scenarios and measure energy consumption.

To order
MDG993EBMB | MINIBAT bench

Educational Solutions Catalogue - 2015/2016
Learning objectives
- To analyze the functions and the principle of a home automation installation on a KNX bus
- To install and connect components
- To configure the system according to various scenarios
- To grasp the concepts of energy efficiency

Main industries
- Electrical engineering
- Electrotechnical engineering

Characteristics

| Power supply | 230 V |
| Dimensions (H x W x D) | 1030 x 910 x 400 mm |
| Weight | 6.5 kg |
| Modules | 70 x 150 x 245 mm |
| Weight | 0.7 kg |

Presentation
These benches are made up of a set of KNX modules adapted for training purposes. They are designed for controlling functions such as lighting, heating, blinds and sockets in commercial buildings. The KNX CI solution is a standard familiarization package for the most common functions. The KNX PRO solution can be used to highlight how much easier it is to set up compared to traditional wiring. These packages can be complemented by actual operative parts such as the roller blind offered as an option.

Composition
The 2 global offers, KNX CI and KNX PRO, consist of the modules below. You can also order each module separately according to requirements.

<table>
<thead>
<tr>
<th>Description</th>
<th>KNX CI</th>
<th>KNX PRO</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support frame</td>
<td>1</td>
<td>1</td>
<td>MD1AM000</td>
</tr>
<tr>
<td>Single-phase protection module</td>
<td>1</td>
<td>1</td>
<td>MD1AM2001</td>
</tr>
<tr>
<td>Module with 4 outputs</td>
<td>1</td>
<td>1</td>
<td>MD1AM3003</td>
</tr>
<tr>
<td>Module with 4 x 230 V inputs</td>
<td>1</td>
<td>1</td>
<td>MD1AM3004</td>
</tr>
<tr>
<td>Dimmer module</td>
<td>1</td>
<td>1</td>
<td>MD1AM3005</td>
</tr>
<tr>
<td>0-10 V dimmer module</td>
<td>1</td>
<td>1</td>
<td>MD1AM3042</td>
</tr>
<tr>
<td>USB interface module</td>
<td>1</td>
<td>1</td>
<td>MD1AM3007</td>
</tr>
<tr>
<td>Smartphone IP router module</td>
<td>1</td>
<td>1</td>
<td>MD1AM3044</td>
</tr>
<tr>
<td>IP controller module</td>
<td>1</td>
<td>1</td>
<td>MD1AM3049</td>
</tr>
<tr>
<td>Roller blind actuator module</td>
<td>1</td>
<td>1</td>
<td>MD1AM3008</td>
</tr>
<tr>
<td>Artec double pushbutton module</td>
<td>1</td>
<td>1</td>
<td>MD1AM3009</td>
</tr>
<tr>
<td>Artec IR MF8 pushbutton module</td>
<td>1</td>
<td>1</td>
<td>MD1AM3010</td>
</tr>
<tr>
<td>Artec MF4 pushbutton module</td>
<td>1</td>
<td>1</td>
<td>MD1AM3011</td>
</tr>
<tr>
<td>Argus motion sensor module</td>
<td>1</td>
<td>1</td>
<td>MD1AM3013</td>
</tr>
<tr>
<td>Mplan pushbutton module with 4 thermostats</td>
<td>1</td>
<td>1</td>
<td>MD1AM3017</td>
</tr>
<tr>
<td>24 V power supply module</td>
<td>1</td>
<td>1</td>
<td>MD1AM3032</td>
</tr>
<tr>
<td>Hotel card reader</td>
<td>1</td>
<td>1</td>
<td>MD1AM6031</td>
</tr>
<tr>
<td>3-channel KNX energy metering module</td>
<td>1</td>
<td>1</td>
<td>MD1AM3046</td>
</tr>
<tr>
<td>3 x 50/5 A CT module</td>
<td>1</td>
<td>1</td>
<td>MD1AM2004</td>
</tr>
<tr>
<td>Traditional pushbutton</td>
<td>1</td>
<td>1</td>
<td>MD1AM6007</td>
</tr>
<tr>
<td>15 W lamp</td>
<td>2</td>
<td>2</td>
<td>MD1AMP004</td>
</tr>
<tr>
<td>Electric blind</td>
<td>1</td>
<td>1</td>
<td>MD1AMP007</td>
</tr>
<tr>
<td>Wireless router module</td>
<td>1</td>
<td>1</td>
<td>MD1AM2010</td>
</tr>
<tr>
<td>42 W halogen or LED lamp</td>
<td>1</td>
<td>1</td>
<td>MD1AMP009</td>
</tr>
<tr>
<td>Lamp + dimmer</td>
<td>1</td>
<td>1</td>
<td>MD1AMP022</td>
</tr>
<tr>
<td>ETS5 Lite software (1 station)</td>
<td>1</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>ETS5 PRO software (academic site)</td>
<td>1</td>
<td>1</td>
<td>-</td>
</tr>
</tbody>
</table>

Benefits
- Use of digital tools to control a home automation application
- Quick, safe setup
- Rugged wiring on safety sockets

To order
- MD1AMLKNXCI: Entry-level KNX modular offer
- MD1AMLKNXPRO: Professional KNX modular offer
- MD1AAVOLET: Roller blind adapted for training
Building management

**Energy efficiency KNX modular offer**

EE KNX bench

### Learning objectives
- To analyze the functions and the principle of a home automation installation on a KNX bus
- To install and connect components
- To configure the system according to various scenarios
- To grasp the concepts of energy efficiency

### Main industries
- Electrotechnical engineering
- Energy engineering
- Electronic engineering

### Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>Support frame 1030 x 910 x 400 mm 6.5 kg</td>
</tr>
<tr>
<td>Weight</td>
<td>Modules 70 x 150 x 245 mm 0.7 kg</td>
</tr>
</tbody>
</table>

### Composition

The KNX EE global offer consists of the modules below. You can also order each module separately according to requirements.

<table>
<thead>
<tr>
<th>Description</th>
<th>KNXEE</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support frame</td>
<td>1</td>
<td>MD1AM000</td>
</tr>
<tr>
<td>Single-phase protection module</td>
<td>1</td>
<td>MD1AM2001</td>
</tr>
<tr>
<td>Bus power supply module</td>
<td>1</td>
<td>MD1AM3001</td>
</tr>
<tr>
<td>Module with 2 outputs</td>
<td>2</td>
<td>MD1AM3045</td>
</tr>
<tr>
<td>4-channel dimmer module</td>
<td>1</td>
<td>MD1AM3042</td>
</tr>
<tr>
<td>USB interface module</td>
<td>1</td>
<td>MD1AM3007</td>
</tr>
<tr>
<td>Roller blind actuator module</td>
<td>1</td>
<td>MD1AM3008</td>
</tr>
<tr>
<td>Double pushbutton module</td>
<td>1</td>
<td>MD1AM3009</td>
</tr>
<tr>
<td>8-button + IR pushbutton module</td>
<td>1</td>
<td>MD1AM3010</td>
</tr>
<tr>
<td>4-button pushbutton module</td>
<td>1</td>
<td>MD1AM3011</td>
</tr>
<tr>
<td>IR occupancy and light level module</td>
<td>1</td>
<td>MD1AM3014</td>
</tr>
<tr>
<td>Pushbutton module with 4 thermostats</td>
<td>1</td>
<td>MD1AM3017</td>
</tr>
<tr>
<td>24 V power supply module</td>
<td>1</td>
<td>MD1AM3032</td>
</tr>
<tr>
<td>Ethernet and controller module</td>
<td>1</td>
<td>MD1AM3049</td>
</tr>
<tr>
<td>Weather station</td>
<td>1</td>
<td>MD1AM3047</td>
</tr>
<tr>
<td>Servo motor module for valve</td>
<td>1</td>
<td>MD1AM3021</td>
</tr>
<tr>
<td>Remote control</td>
<td>1</td>
<td>MTN5761-0000</td>
</tr>
<tr>
<td>15 W lamp module</td>
<td>2</td>
<td>MD1AMP004</td>
</tr>
<tr>
<td>50 W lamp module</td>
<td>2</td>
<td>MD1AMP009</td>
</tr>
<tr>
<td>Electric blind</td>
<td>1</td>
<td>MD1AMP007</td>
</tr>
<tr>
<td>Multi-address DALI lighting</td>
<td>1</td>
<td>MD1AMP025</td>
</tr>
<tr>
<td>Wireless router module</td>
<td>1</td>
<td>MD1AM2010</td>
</tr>
<tr>
<td>PM power meter module</td>
<td>1</td>
<td>MD1AM2003</td>
</tr>
<tr>
<td>3-channel KNX energy metering module</td>
<td>1</td>
<td>MD1AM3046</td>
</tr>
<tr>
<td>3 x 50/5 A CT module</td>
<td>1</td>
<td>MD1AM2004</td>
</tr>
<tr>
<td>ETS5 Lite software (1 station)</td>
<td>1</td>
<td>No ref.</td>
</tr>
<tr>
<td>ETS5 PRO software (academic site)</td>
<td>1</td>
<td>No ref.</td>
</tr>
</tbody>
</table>

### Benefits
- Use of digital tools to control a home automation application
- Multifunction: pilot control, programming, telemetry, video
- Multiprotocol: KNX, Modbus, DALI, BACnet

### Presentation

This bench is used to explore KNX solutions complying with the requirements of the RT2012 standard, in other words ensuring active energy efficiency and comfort. It consists of the most commonly used functions, which will generate energy savings as a result of being controlled by the KNX protocol. The components are adapted for training purposes in boxes to be installed on a stand, and connected using safety leads. This package can be complemented by actual operative parts such as the roller blind offered as an option.

### To order

<table>
<thead>
<tr>
<th>MD1AMLKNXEE</th>
<th>EE KNX modular offer</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AAVOLETR</td>
<td>Roller blind adapted for training</td>
</tr>
</tbody>
</table>
Learning objectives

- To discover the advantages of home automation over conventional wired solutions
- To set up a KNX installation
- To control the installation remotely using InSideControl
- To optimize energy consumption
- To study the data circuit
- To create a remotely-controlled home automation project

Presentation

The HOME I/O software with its 8I/8O interface unit can be used to create a 3D virtual home that can be remotely controlled by an external device. The package replaces the actual operative parts very effectively, while retaining the connections to sensors and home automation actuators. Energy consumption varies according to how the home is controlled and the climatic conditions. Time can be speeded up to model real-life operation.

Developed in partnership with the University of Reims and the Real Games company, the HOME I/O software is marketed by Schneider Electric.

This software was endorsed by the French Ministry of Education in 2014. A KNX bench can be used for external control purposes (see pages 65 and 66). A KNX connection module is offered as an option.

Main industries

- Energy engineering
- Energy engineering
- Electrotechnical engineering

Characteristics

| Power supply | 24 VDC |
| Dimensions (H x W x D) | 245 x 150 x 70 mm |
| Weight | 0.7 kg (interface module) |
| Recommended configuration | Operating system from Windows XP SP2 onwards |

Description

- 1 license for the HOME I/O software
- 1 interface unit with 8 discrete inputs and 8 discrete outputs

Optional for connection on a KNX bench

- KNX module with 8 inputs

Benefits

- Use of 3D tools
- Combination of real-life and virtual scenarios
- Gradual implementation of the automated building

To order

| MD1AM0029 | Home I/O software and interface unit |
| MD1AM3051 | KNX module with 8 inputs |

Building management

HOME I/O software plus interface

3D smart home

HOME I/O software and interface unit

MD1AM0029

Home I/O software and interface unit

MD1AM3051

KNX module with 8 inputs
Learning objectives
- To analyze the functions and the principle of a home automation installation on a KNX bus
- To install and connect components
- To configure the system according to various scenarios
- To grasp the concepts of energy efficiency

Main industries
- Electrical engineering
- Electrotechnical engineering
- Energy engineering

Characteristics

| Power supply | 230 V |

Presentation
The packs included in this offer allow you to create training versions of KNX installations on your premises, and to set them up in your 3D training cubicles. These can be complemented by functions such as a weather sensor, clock, CO2 sensor, energy meter, Modbus gateway, web module or smartphone access.

Composition
The KNXD pack is designed to demonstrate the KNX system. The KNXVR teaching pack will help students gain greater expertise. Its 7” touch screen and dedicated actuator for roller blinds or awnings facilitate understanding of all the functions of the KNX bus as well as the principles of energy efficiency.

<table>
<thead>
<tr>
<th>Description</th>
<th>KNXD</th>
<th>KNXVR</th>
</tr>
</thead>
<tbody>
<tr>
<td>KNX bus power supply</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>USB interface</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>IP router</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Switch with 2 buttons</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Switch with 8 buttons</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Infrared presence sensor</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>7” screen</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4-channel switching actuator</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4-channel dimming actuator</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>KNX/DALI gateway</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Roller blind actuator</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Opale cabinet, 3 rows</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>30 mA/10 A RCBO</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>ETS5 Lite software (1 license)</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Benefits
- Low-cost solution
- Predefined package
- Actual KNX installation wiring

To order
- MD1AAKNXD | Entry-level KNX pack
- MD1AAKNXVR | Upgrade KNX pack
Building management

Commercial building energy management 3D cubicle
Commercial SMART HOME

Learning objectives
- To commission, connect, configure, alter an installation
- To manage scenarios
- To apply the SEEN aspects of the RT2012 standard:
  - data displayed via web browser in tandem with the IRIO energy controller
  - metering of main uses: sockets, heating, lighting, water meter
- To apply the ACTION aspects of RT2012 via a KNX bus:
  - standard lighting management
  - electric heating management
  - shutter and lighting management

Main industries
- Electrical engineering
- Electrotechnical engineering

Characteristics

| Power supply | 230 V/700 VA |
| Dimensions (H x W x D) | 1 module 2400 x 1375 x 1625 mm 400 kg |
| Weight | 2 modules 2400 x 2750 x 1625 mm 800 kg |

Presentation
The SMART HOME 3D cubicle developed in partnership with BEMA is designed to study and learn how to set up a commercial building type installation. The installation is controlled via a KNX bus. Energy management via IRIO can be used to illustrate applications of the RT2012 energy efficiency standard. Various configurations are possible for this equipment.

Description
- Mechanically-welded structure, external partitions made of FERMACEL, internal partitions made of laminate
- Window with controllable roller blind, double-glazed with Securit glass
- Floor consisting of a 3-ply plywood laminate panel (washable)
- 2 x 50 W halogen spotlights:
  - 1 spotlight for dimming
  - 1 spotlight connected to terminal block for wiring
- 2 x 300 W halogen spotlights with local control via display unit
- 1 x 1500 W radiant convection heater
- 1 motion and presence sensor, 4 zones
- 1 IRIO energy controller
- Acquisition and servocontrol of light level
- Water meter outdoors
- Modbus, Ethernet energy meters
- KNX bus
- 7” touch screen
- ETSS Lite software: 1 Lite license provided

Benefits
- Different types of lighting possible on request (halogen, LED, etc.)
- Practical exercises available in digital file format to allow students to work independently
- Openness to fibre optics

To order
UEHGSHT | Please consult us to define the configuration
Building management

Building energy telemetry modular offer
IRIO modular offer

Learning objectives
- To set up a remote building management solution
- To view the breakdown of consumption by use: fluids, electricity, etc.
- To grasp the concepts of energy efficiency in the housing sector
- To understand the constraints of the RT2012 energy efficiency standard
- To configure a remote management installation to optimize energy consumption

Presentation
The central element of the telemetry modular offer is an IRIO energy controller, which collects and stores the data generated by energy and fluid meters, temperature or pressure sensors. Using a simple web browser, the IRIO energy controller can be used to operate and manage an installation remotely via a single, easy-to-use interface.

Composition
The MD1AMLIRIO global offer consists of the modules below. You can also order each module separately according to requirements.

<table>
<thead>
<tr>
<th>Description</th>
<th>Qty</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support frame</td>
<td>1</td>
<td>MD1AM000</td>
</tr>
<tr>
<td>IRIO double controller module</td>
<td>1</td>
<td>MD1AM2006</td>
</tr>
<tr>
<td>24 VDC power supply module</td>
<td>1</td>
<td>MD1AM4001</td>
</tr>
<tr>
<td>Modbus SIM module</td>
<td>1</td>
<td>MD1AM2007</td>
</tr>
<tr>
<td>Zigbee SIM module</td>
<td>1</td>
<td>MD1AM2008</td>
</tr>
<tr>
<td>Ethernet gateway/Zigbee module</td>
<td>1</td>
<td>MD1AM2009</td>
</tr>
<tr>
<td>Modbus splitter box module</td>
<td>1</td>
<td>MD1AM0011</td>
</tr>
<tr>
<td>PM3250 power meter module</td>
<td>1</td>
<td>MD1AM2003</td>
</tr>
<tr>
<td>Module with 3 current transformers</td>
<td>1</td>
<td>MD1AM2004</td>
</tr>
<tr>
<td>Wi-Fi router module</td>
<td>1</td>
<td>MD1AM2010</td>
</tr>
<tr>
<td>Water meter operative part module</td>
<td>1</td>
<td>MD1AMP017</td>
</tr>
<tr>
<td>Transmitter + temperature sensor module</td>
<td>1</td>
<td>MD1AMP018</td>
</tr>
</tbody>
</table>

Main industries
- Energy engineering
- Energy engineering
- Electrical engineering
- Automation engineering
- Industrial maintenance

Characteristics
<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>1030 x 910 x 400 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>6.5 kg</td>
</tr>
<tr>
<td>Single module</td>
<td>245 x 150 x 70 mm</td>
</tr>
<tr>
<td></td>
<td>0.7 kg</td>
</tr>
<tr>
<td>Double module</td>
<td>245 x 300 x 70 mm</td>
</tr>
<tr>
<td></td>
<td>1.4 kg</td>
</tr>
</tbody>
</table>

Benefits
- Quick, safe setup
- Safe, rugged wiring

To order
MD1AMLIRIO | IRIO telemetry modular offer
Energy efficiency cabinet

Learning objectives
- To set up energy monitoring of devices
- To use and configure a power meter:
  - create a power consumption table
  - implement optimization solutions
  - monitor the results of energy-saving actions over time
  - ascertain the status of an installation

Main industries
- Electrical engineering
- Energy engineering

Characteristics
<table>
<thead>
<tr>
<th>Description</th>
<th>Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>This electrical distribution cabinet is used to monitor electricity consumption in order to determine how energy-efficient a device is. It is connected to the AC power supply and can be used to supply a training device or an actual device with single-phase or three-phase current. A switch is used to select one of three operating modes:</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>on a 16 A single-phase industrial socket</td>
</tr>
<tr>
<td>Weight</td>
<td>on a 32 A three-phase industrial socket</td>
</tr>
</tbody>
</table>

- In remote reading mode, connected with cables and busbar grips
- The consumption data can be accessed on the EGX300 gateway via an Ethernet socket located on the front of the cabinet.

To order
- MDG99140 Energy efficiency cabinet

Benefits
- Mobile equipment
- Ease of setup between the AC power supply and the device to be measured
- Rugged equipment
Building management

Electrical distribution software

Learning objectives
● To calculate electrical installations
● To select equipment
● To create technical files

Main industry
● Electrical engineering

Presentation
This free software can be used to calculate electrical distribution installations, and to configure and cost switchboards for the residential or commercial sector.
It can be downloaded from the Schneider Electric website.
For some software, you need to register first in the PRO zone.

Description

Rapsody
For designing and costing a residential or commercial switchboard.
This software prints out the switchboard front panel, the single-line diagram and a costing.

ProClima*
For making thermal calculations of electrical cabinets

MyEcodial *
For designing and calculating low voltage electrical installations

VarSet Pro *
For sizing a capacitor bank

Bâti-Rési Suite
For designing and costing low power and high power electrical equipment in residential and commercial buildings (new-build or refurbishment)

SunEsy Design*
For designing a photovoltaic installation

Universal enclosures selection guide
For selecting enclosures and their accessories.

CanBRASS
For costing prefabricated busbar trunking

* Requires registration in the PRO zone.

Benefits
● Free professional software
● Help for training projects

To order
Download links
http://www.schneider-electric.com/fr/fr/download/
http://www.schneider-electric.fr/sites/france/fr/support/logitheque/logiciels.page
Building management & energy efficiency

Building communication
Building management & energy efficiency

Building communication

- FTTH fibre optic packs ........................................ page 76
- LAN/FTTO fibre optic packs .................................... page 77
- Fibre optic training bench ....................................... page 78
- Fibre optic accessories ........................................... page 80
- 19” VDI pack ........................................................ page 82
Building communication

FTTH fibre optic packs

Learning objectives
- To lay and establish fibre optic connections
- To test continuity
- To maintain them in working condition
- To make repairs

Presentation
These FTTH fibre optic hardware architecture packs should be set up in your 3D cubicles, or on a BA13 stand. An FO service case contains all the tools needed to prepare the fibre.

Main industries
- Electrical engineering
- Electronic engineering

Characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>FTTH column</th>
<th>Service case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>700 x 700 x 500 mm</td>
<td>360 x 228 x 90 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>2 kg</td>
<td>0.8 kg</td>
</tr>
</tbody>
</table>

Description

**FTTH riser fibre optic kit**
- 1 building shared access point cabinet with operator zone and customer zone
- 1 operator splicing unit
- 1 cassette with 12 fusion-spliced SC-APC pigtails
- 2 fibre optic shared access points with splice tray
- 4 fibre optic terminations for use in homes
- 100 m of ITU-G657A 1x4FO fibre optic cables for indoor connections
- 50 m of 12-fibre ITU-G652D cable for outdoor connections
- 1 x 6 m riser duct
- 2 RJ/fibre optic converters

**Service ducting kit**
- OPALE cabinet
- Power distribution part: 1 residual current circuit breaker, 6 circuit breakers, RT2012-compliant WISER energy meter, RJ45 Ultra and fibre optic terminals
- Communication part: grade 4 manual communication cabinet

**Fibre optic service case**
- 1 EXFO fibre optic power meter
- 1 pen-type fibre optic tester (850 nm)
- 1 complete set for cleaning connectors: IBC pen 1.25 mm-2.5 mm, wipes, etc.
- 1 Miller fibre optic stripper
- 1 Kabifix fibre optic cable stripper

Benefits
- Installation in 3D cubicle
- Energy metering solution on embedded Ethernet
- Grade 4 communication cabinet

To order

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1ALFOFTTHM</td>
<td>FTTH riser</td>
</tr>
<tr>
<td>MD1ALFOGTL1</td>
<td>Service ducting kit</td>
</tr>
<tr>
<td>MD1ALFOBVAL</td>
<td>Fibre optic service case</td>
</tr>
</tbody>
</table>

Fibre optic service case
Building communication

LAN-FTTO fibre optic packs

Learning objectives
- To learn about the components of an FO architecture and the various types of fibre and connectors
- To learn how to handle and prepare the fibre: cleaning, stripping and cleaving
- To lay FO cables and check their routing
- To connect connectors on LC fibre
- To find any mechanical stress (VFL)
- To measure the power and attenuation with a photometer and light source

Presentation
This offer includes two packs that can be used to create FO connections between two communicating systems in the workshop:
- The prefibred connector technique is used by electricians and gives a fast, efficient result.
- The mechanical splicing technique, which is simple and efficient, has replaced fusion splicing. It is used for repair and maintenance.

Main industries
- Electrical engineering
- Electronic engineering
- Electrical engineering

Characteristics

<table>
<thead>
<tr>
<th>Dimensions (H x W x D)</th>
<th>Pack of FO connectors</th>
<th>Pack of FO splicers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>1000 x 1000 x 1000 mm</td>
<td>1000 x 1000 x 1000 mm</td>
</tr>
<tr>
<td></td>
<td>7 kg</td>
<td>7 kg</td>
</tr>
</tbody>
</table>

Equipment common to both packs
- 1 x 525 m drum of tight-buffered 6-strand OM3 multimode fibre
- 1 9U VDI OPB swing-rack cabinet
- 1 technical logbook with samples of the various connector types
- 2 fibre optic drawers for cabinet and rack
- 2 Cat. 6A copper 12-port copper drawers with a core
- 2 copper/FO transceivers (1 x 19” commercial and 1 industrial for DIN rail)
- 1 VFL for viewing faults with a light effect
- 1 multi-mode photometer with 850 nm light source

Pack of prefibred FO connectors
- 1 special tools case including a cleaver and a VFL
- 1 set of 50 prefibred connectors

Pack of mechanical FO splicers
- 1 special tools case including a cleaver
- 1 set of 24 pigtails + 24 mechanical splicers
- 1 tester

FTTO starter kit
- 100 m of preterminated tight-buffered 6-fibre cable
- 2 fibre optic drawers for cabinet and 19” rack
- 2 copper/fibre optic transceivers
- 1 tool for mechanical splicing
- 12 OM3 SC pigtails
- 6 reusable mechanical splicers
- 1 complete connector cleaning set
- 1 Miller fibre optic stripper
- 1 Kabifix fibre optic cable stripper

Benefits
- Integrated in the communicating LV switchboard scenario
- Bespoke solution based on local architectures

To order

<table>
<thead>
<tr>
<th>MD1ALFOP</th>
<th>Pack of prefibred FO connectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1ALFOE</td>
<td>Pack of mechanical FO splicers</td>
</tr>
<tr>
<td>MD1ALFOEMN</td>
<td>FTTO starter kit</td>
</tr>
<tr>
<td>MD1ALFOCP</td>
<td>Prefibred connector consumables</td>
</tr>
<tr>
<td>MD1ALFOCE</td>
<td>Mechanical splicer consumables</td>
</tr>
</tbody>
</table>
Building communication

**Fibre optic training bench**

### Learning objectives
- To lay and connect optical fibres, coaxial cable and Cat. 6/7 Ethernet cable:
  - fibre optic and copper patch cables
- To see how RJ45 and coaxial cables perform compared to fibre optics
- To select technologies according to the type of project
- To mark up circuits
- To test level 1 continuity: VFL
- To compile a fibre optics evaluation report:
  - photometry
  - reflectometry
  - acceptance document
- To study the reception and transmission of OFDM signals (DTTV)
- To learn about video streaming over IP
- To analyze IP streams

### Presentation
The FO training bench incorporates all the FTTO/FTTH architectures of a complete network installation with the active equipment. One side represents the NRO operator side. The other side represents the building side.

The entry-level bench is equipped with a number of physical structures (coaxial, copper and fibre optic) and can be used to highlight the advantages of fibre optics. A number of packages are offered on the next page to make up the equipment with the IPTV, coaxial and server options.

This equipment, developed by MTFibertech, is marketed by Schneider Electric.

### Description

#### Entry-level FO bench
- 1 cupboard on castors with 2 sides, 8 lockable doors
- 1 interior lighting system on each side
- 1 modular distribution board with 40 A/30 mA residual current circuit breaker, 2 x 16 A circuit breakers, equipotentially bonded and earthed by an aluminium grille
- 1 set of connecting cable ducts
- 1 set of hard-wired 230 VAC sockets
- 4 GBE media converters with 4 x 1550/1310 nm bi-directional SFP
- 1 holder and operator splicing cassette (OMDF) with 12 fusion-spliced SC-APC pigtails + bushings
- 1 cable slack spool for storing excess lengths
- 2 SM G652D FO reels (1000 m/2000 m), SC-APC connectors
- 4 LCPC/SCAPC fibre optic patches, 8 SCAPC/SCAPC patches
- 1 x 12FO ITU-G652D fibre optic network cable (50 m)
- 1 network operator building shared access point with splicing cassette, 1:4 splitter, 12 SCAPC pigtails, 24 SCAPC bushings
- 1 building operator building shared access point with splicing cassette, 8 pigtails, 12 SCAPC bushings
- 1 connected FO cable for indoor use ITU-G657A 1x4FO (shared access point-termination) + 50 m in reserve
- 1 Home Premium LexCom VDI cabinet
- 2 fibre optic terminations with 4 SC-APC pigtails
- 2 double RJ45 sockets with S-One connector
- 2 single RJ45 sockets with S-One connector
- 1 x 10/100/1000 switch with 5 ports (VDI cabinet)

### Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>230 V</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>2030 x 1250 x 1000 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>320 kg</td>
</tr>
</tbody>
</table>

### Main industries
- Electronic engineering
- Electrical engineering
- Electronic engineering
- Electrotechnical engineering
- Telecommunications engineering

### Benefits
- Comprehensive training, gradual method, fun content (TV, Internet, IPTV)
- Allows several groups of students to work simultaneously
- Lockable cupboard with storage areas

### To order
- MD1ALFOBFTT | Entry-level fibre optic bench
- MD1ALFOBOIPTV | IPTV option
- MD1ALFOBOCX | Coaxial option
- MD1ALFOBOSV | Server option
- MD1ALFOBMES | FO bench commissioning
Learning objectives
- To lay and connect optical fibres, coaxial cable and Cat. 6/7 Ethernet cable:
  - fibre optic and copper patch cables
- To see how RJ45 and coaxial cables perform compared to fibre optics
- To select technologies according to the type of project
- To mark up circuits
- To test level 1 continuity: VFL
- To compile a fibre optics evaluation report:
  - photometry
  - reflectometry
  - acceptance document
- To study the reception and transmission of OFDM signals (DTTV)
- To learn about video streaming over IP
- To analyze IP streams

Main industries
- Electronic engineering
- Electrical engineering
- Electronic engineering
- Electrotechnical engineering
- Telecommunications engineering

Characteristics
- **Power supply**: 230 V
- **Dimensions (H x W x D)**: 2030 x 1250 x 1000 mm
- **Weight**: 320 kg

Benefits
- Comprehensive training, gradual method, fun content (TV, Internet, IPTV)
- Allows several groups of students to work simultaneously
- Lockable cupboard with storage areas

Presentation
The entry-level FO bench on the previous page incorporates all the FTTO/FTTH architectures of a network installation with the active equipment. The packages shown on this page allow you to add IPTV, coaxial and server options to the basic equipment. This equipment, developed by MTFibertech, is marketed by Schneider Electric.

Description
**IPTV option**
- 1 manageable L2 switch (Vlan, QoS, port mirroring, IGMP, etc) with 8 x 10/100/1000 ports
- 1 amplified indoor/outdoor DTTV aerial
- 1 DTTV/IPTV streamer
- 2 IPTV decoder receivers
- 2 x 19" LED TVs with stand
- 1 single RJ45 socket with S-One connector
- 1 RJ45 patching system
- 3 reels of Cat. 6 or 7 flexible cable (90 m, 30 m, 20 m)
- 6 RJ45-RJ45 shielded connectors

**Coaxial option**
- 1 boosted indoor/outdoor DTTV aerial
- 1 x 1310 nm/6 dBm fibre optic converter transmitter (48-860 MHz)
- 1 analog DTTV-PAL converter
- 1 set of HF splitter boxes
- 2 x 19" LED TVs with stand (if IPTV option not present)
- 1 TV/radio coaxial connector
- 1 coaxial patching terminal block
- 3 reels of 75 Ohm coaxial cable (3 x 100 m)
- 1 R-TV booster splitter module for Grade 3 wiring with 6 x RJ45 (5-860 MHz)
- 1 RJ45-IEC TV cable
- 1 x 1310-1550 nm fibre optic receiver (VDI cabinet)

**Server option**
- 1 PC with Linux operating system
- 1 USB stick with configurations and installation manual for creating and configuring a DHCP/FTP/SIP server
- VLC used in streaming/reception mode
- Wireshark used to analyze streams

To order
<table>
<thead>
<tr>
<th>MD1ALFOBFTT</th>
<th>Entry-level fibre optic bench</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1ALFOBIOPTV</td>
<td>IPTV option</td>
</tr>
<tr>
<td>MD1ALFOBCX</td>
<td>Coaxial option</td>
</tr>
<tr>
<td>MD1ALFOBSV</td>
<td>Server option</td>
</tr>
<tr>
<td>MD1ALFOBMES</td>
<td>FO bench commissioning</td>
</tr>
</tbody>
</table>
Building communication

Fibre optic accessories

Fusion splicers

Learning objectives

- To prepare the optical fibre
- To test a fibre optic network
- To maintain it in working condition
- To establish connections

Presentation

These accessories are offered alongside FO packs for creating and checking your work on the fibre optic bench, the communicating LV switchboard and 3D cubicles.

Main industries

- Electronic engineering
- Electrical engineering
- Electronic engineering
- Electrotechnical engineering
- Telecommunications engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Dimensions (H x W x D)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>230 V</td>
<td>137 x 130 x 155 mm</td>
<td>1.8 kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>60 x 110 x 140 mm</td>
<td>0.65 kg</td>
</tr>
</tbody>
</table>

Core alignment fusion splicer + cleaver

- 1 fusion splicer + 1 cleaver in rigid case
- 1 x 4.1” (10.4 cm) LCD touch screen
- 7 s splice time, 28 s dual-oven heat shrink cycle, IP52 protection
- 1 pair of replacement electrodes (6000 splices)
- USB2
- Built-in video devices (2.1 kg) with battery
- 1 automatic rotary blade (48,000 cutting operations)
- 1 lid for fibre scrap collector

Eco sheath-type fusion splicer + cleaver

- 1 touch screen fusion splicer in flexible case
- FHS-025 removable clamps
- 1 ADC-1340A power supply
- ER-11 replacement electrodes
- 1 FCT-201 splice protection sleeve tray
- 1 fixing strap
- 1 precision cleaver (video output)
- 1 manual on CD

Drive kit for fusion splicer

- 200 heat shrink splice protection sleeves
- 20 m of 12FO cable, 24 x 2 m pigtails, 2 cassettes

Benefits

- Professional tools
- Equipment selected for Schneider Electric FO offers

To order

<table>
<thead>
<tr>
<th>Reference</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1ALFOSD15</td>
<td>Core alignment fusion splicer + cleaver</td>
</tr>
<tr>
<td>MD1ALFOSDG</td>
<td>Sheath-type fusion splicer + cleaver</td>
</tr>
<tr>
<td>MD1ALFOENT</td>
<td>Drive kit for fusion splicer</td>
</tr>
</tbody>
</table>
Building communication

Fibre optic accessories

FO measuring equipment

Learning objectives
- To prepare the optical fibre
- To test a fibre optic network
- To maintain it in working condition
- To establish connections

Main industries
- Electronic engineering
- Electrical engineering
- Electronic engineering
- Electrotechnical engineering
- Telecommunications engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certifier</td>
<td>80 x 80 x 175 mm</td>
</tr>
<tr>
<td>Reflectometer</td>
<td>130 x 252 x 56 mm</td>
</tr>
</tbody>
</table>

Description
These accessories are offered alongside FO packs for creating and checking your work on the fibre optic bench, the communicating LV switchboard and 3D cubicles.

Certifier
- Qualifier of active and passive networks
- Copper and fibre optic via universal SFPs
- Load test via active devices (switches) for web applications, VoIP, IP camera and IP video

Reflectometer
- Fibre optic link mapping
- dB attenuation and length of fibre
- Event location and qualification:
  - cutting operations
  - connectors and fittings
  - seams, splices, fittings
  - mechanical stress

Photometer, inspection probe
Available on request

Presentation

To order

<table>
<thead>
<tr>
<th>MD1ALFA14</th>
<th>MD1ALFODTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certifier</td>
<td>Reflectometer</td>
</tr>
</tbody>
</table>
19” VDI pack

Learning objectives
- To identify and select equipment (UPS, switches, sockets)
- To set up VDI racks, wire RJ45 connectors
- To address the IP switch
- To mark up, patch and test the installation
- To study different VDI networks depending on the office location

Presentation
The 19” VDI pack is designed for studying VDI functions encountered in industrial or commercial installations. It highlights the general organization of a VDI network. Instruction is based on an actual specification: the STS for an office block.

Main industries
- Electrical engineering
- Electronic engineering
- Electrotechnical engineering
- Electronic engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>800 x 600 x 600 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>12 kg</td>
</tr>
</tbody>
</table>

Description
The VDI pack consists of:
- 1 x 12U 19” fixed chassis OPB cabinet, 646 x 600 x 500, glazed door
- 1 backplate for 12U 19” OPB cabinet
- 1 blanking plate with ventilation louvres at the top
- 1 blanking plate with brush seal at the bottom
- 1 sliding panel equipped with 24 FTP STP RJ45 ports
- 1 TELECOM sliding panel with 50 ports on 2 rows
- 1 panel with 8 230 V/16 A FR sockets, protected illuminated switch
- 2 cable guide panels with 4 rings
- 2 rack pack kits for UPS
- 1 fixed shelf 250 mm deep 15 kg load
- 3 metal spacer panels
- 3 panels for vertical cable organization
- 1 DLINK switch with 24 x 10/100 BASE-TX managed Ethernet ports
- 1 x 1500 VA APC Smart-UPS
- 1 pack of 24 blue RJ45 dust covers
- 1 pack of 24 green RJ45 panel dust covers
- 1 pack of 10 earthing kits for 19” panel
- 1 stripping tool for connecting LSA connectors
- 24 x 1 m cables, Category 6 RJ45/RJ45, F/UTP shielding
- 24 FTP Category 6 RJ45 connectors

Benefits
- Complete predefined package
- Low-cost solution

To order
MD1ALVDIC19 | 19” VDI pack

Educational Solutions Catalogue - 2015/2016
Building management & energy efficiency

Energy efficiency
### Energy efficiency

**Building management & energy efficiency**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greenhouse management system</td>
<td>86</td>
</tr>
<tr>
<td>Ventilation EE case</td>
<td>87</td>
</tr>
<tr>
<td>Ventilation EE modular offer</td>
<td>88</td>
</tr>
<tr>
<td>Ventilation bench with variable speed control</td>
<td>89</td>
</tr>
<tr>
<td>Air handling unit</td>
<td>90</td>
</tr>
<tr>
<td>Heating control bench</td>
<td>91</td>
</tr>
<tr>
<td>Air/air heat pump bench</td>
<td>92</td>
</tr>
<tr>
<td>Twin-flow ventilation bench</td>
<td>93</td>
</tr>
</tbody>
</table>
Energy efficiency

Greenhouse management system
SERRALIS

Learning objectives
- To develop EE activities:
  - studying heat transfer by convection, radiation and conduction
  - studying energy performance, free heat gains, metering
- To develop AC activities:
  - studying insulating materials
  - studying ventilation
- To develop Innovation & Ecodesign activities:
  - working on INVENTOR and SOLIDWORKS
  - studying the opening mechanism

Main industry
- Energy engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/300 VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>430 x 630 x 365 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>255 x 560 x 460 mm</td>
</tr>
</tbody>
</table>

Description

The SERRALIS system reproduces the functions of a greenhouse with heating, lighting and ventilation. It allows students to work on three different elements of Sustainable Development technology: energy, communication and materials.

Operative part
- Wooden frame with transparent removable partitions and access flap at the top
- 1 x 15 W grow light bulb
- 1 x 50 W heater cable
- 1 x 15 W infrared bulb
- 1 temperature sensor
- 1 x 1.3 W extractor fan
- 1 flap position sensor

Control part
- 1 case with Zelio PLC, discrete and analog I/O
- 1 GSM module
- 1 energy meter
- 1 Modbus module
- 1 measuring point
- 1 supervision application provided to control the functions of the operative part, with Excel charts

Available as an option
A LabVIEW kit to make use of the temperature measurements

SERRALIS with cabinet for LabVIEW option

Benefits
- 50 hrs of practical exercises offered in energy, materials, communication topics
- 3D digital modelling
- Tools offered: INVENTOR, LabVIEW and SOLIDWORKS

To order

<table>
<thead>
<tr>
<th>MD1AEMS</th>
<th>SERRALIS system</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AEMSLV</td>
<td>LabVIEW option</td>
</tr>
</tbody>
</table>
Ventilation energy efficiency case

Learning objectives
- To highlight an energy efficiency solution
- To measure AC power supply and motor U/I depending on the power circuit
- To use a power meter:
  - energy measurements
  - comparison of consumption levels
- To configure the drive in energy-saving profile

Presentation
This case can be used to highlight the energy savings that can be achieved in a pumping or ventilation installation. A comparison is made between electromechanical control via contactor and electronic control with variable speed drive. The ventilation flow is set via an IRIS damper or variable speed control.

Description
The case comprises:
- 1 PM3250 power meter
- 1 direct circuit breaker-contactor feeder
- 1 feeder via 0.18 kW Altivar 312
- 1 direct/variable speed switch
- 1 x 0.18 kW fan
- Measuring points on safety sockets
- 1 EGX300 Ethernet gateway with web server
- 1 USB/RJ45 cable for connecting to the drive
- 1 USB/RJ45 cable for connecting to the gateway
- PowerSuite parameter-setting software supplied on CD-ROM

Features
- Energy engineering
- Electrotechnical engineering
- Energy engineering
- Energy engineering

Characteristics
<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/0.18 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>830 x 500 x 390 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>27 kg</td>
</tr>
</tbody>
</table>

Benefits
- Quiet ventilation equipment
- Understanding of the advantages of variable speed control
- Operating data downloaded to a PC

To order
MD1ATVEE Ventilation energy efficiency case
**Energy efficiency**

**Ventilation energy efficiency modular offer**

**Learning objectives**
- To highlight an energy efficiency solution
- To measure AC power supply and motor U/I depending on the power circuit
- To use a power meter:
  - energy measurements
  - comparison of consumption
- To configure the drive in energy-saving profile

**Main industries**
- Energy engineering
- Electrotechnical engineering
- Energy engineering

**Characteristics**

<table>
<thead>
<tr>
<th>Description</th>
<th>Qty</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support frame</td>
<td>1</td>
<td>MD1AM000</td>
</tr>
<tr>
<td>Magnetic protection module</td>
<td>1</td>
<td>MD1AM1004</td>
</tr>
<tr>
<td>Thermal overload relay module</td>
<td>1</td>
<td>MD1AM1007</td>
</tr>
<tr>
<td>Contactor module</td>
<td>1</td>
<td>MD1AM1008</td>
</tr>
<tr>
<td>PM power meter module</td>
<td>1</td>
<td>MD1AM2003</td>
</tr>
<tr>
<td>3 x 50/5 A CT module</td>
<td>1</td>
<td>MD1AM2004</td>
</tr>
<tr>
<td>EGX300 gateway module</td>
<td>1</td>
<td>MD1AM2005</td>
</tr>
<tr>
<td>Altivar 312 module</td>
<td>1</td>
<td>MD1AM5001</td>
</tr>
<tr>
<td>Variable speed drive control module</td>
<td>1</td>
<td>MD1AM7001</td>
</tr>
<tr>
<td>Motor starter control module</td>
<td>1</td>
<td>MD1AM7004</td>
</tr>
<tr>
<td>24 VDC power supply module</td>
<td>1</td>
<td>MD1AM4001</td>
</tr>
<tr>
<td>Motorized fan with column and ball</td>
<td>1</td>
<td>MD1AMP014</td>
</tr>
</tbody>
</table>

**Presentation**

This equipment is designed to create the equivalent of the energy efficiency case as a mock-up and prototype.

The mock-up can be used to highlight the energy savings that can be achieved in a pumping or ventilation installation.

A comparison is made between electromechanical control via contactor and electronic control with variable speed drive.

The ventilation flow is set via an IRIS damper or variable speed control.

**Composition**

The MD1AMLATVEE kit consists of the modules listed in the table below.

The set is supplied with:
- 1 USB/RJ45 cable for connecting to the drive
- 1 USB/RJ45 cable for connecting to the gateway
- PowerSuite parameter-setting software supplied on CD-ROM

You can also order each module separately according to requirements.

**Benefits**
- Designed for a mock-up and prototype exercise
- Quiet ventilation equipment
- Operating data downloaded to a PC

**To order**

MD1AMLATVEE | Ventilation energy efficiency modular offer
Energy efficiency

Ventilation bench with variable speed control

Learning objectives
- To study the properties of a centrifugal fan
- To measure flows and power consumption
- To study the motor starter functions
- To demonstrate how variable speed control contributes to energy savings
- To study an AHU with energy recovery
- To calculate load losses
- To check the installation EMC levels
- To use the ECO8 software to:
  - compare the performance of DOL starting/ATV61 drive
  - calculate the economic data

Presentation
This bench is used to study the ventilation installation in a commercial building, and to calculate the return on investment of a drive using the ECO8 software.

The bench chimney can be removed for ease of handling.

Two drive modules are available: ATV21 which has a digital display, and ATV61 which has an LCD display.

The fan is controlled by an electromechanical sequence or by a variable speed drive dedicated to pump and fan applications. The flow is regulated mechanically using a valve. An air flow sensor at the top of the chimney can be used to compare the various settings.

Description
- Bench mounted on a frame with locking castors
- 1 x 0.75 kW motorized fan with noise attenuation filter
- 1 electrical cabinet with protection sequence
- 1 ATV21 or 61 HVAC drive with remote display
- 1 power meter with its CTs
- 1 pressure controller with its IRIS-controlled probes
- PowerSuite software for configuring the drive
- ECO8 software for calculating depreciation

Main industry
- Electrotechnical engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>400 V/0.75 kVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>2500 x 1200 x 850 mm</td>
</tr>
<tr>
<td>Height of chimney:</td>
<td>1850 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>133 kg</td>
</tr>
</tbody>
</table>

Benefits
- Mobile equipment
- Equipment with realistic proportions
- Air flow study

To order
- MD1AA750A2 Ventilation bench with Altivar 21
- MD1AA750A6 Ventilation bench with Altivar 61
Energy efficiency

Air handling unit
AHU system

Learning objectives
- To study the functions of an air handling unit:
  - Refrigeration, air flow and electrical circuits
- To commission, configure and maintain the installation
- To study building management PLCs and communication networks
- To calculate energy consumption and performance coefficients

Main industries
- Electrical engineering
- Electrotechnical engineering
- Energy engineering

Characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>400 V/3 to 12 kW depending on options</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>Dep. on configuration</td>
</tr>
<tr>
<td>Weight</td>
<td>Dep. on configuration</td>
</tr>
</tbody>
</table>

Presentation
The AHU system is used to learn about and commission a single-flow air handling unit with filtration, heating, cooling, humidification and dehumidification. Several variants of AHU are available as options. A customized metering compartment can be included.

The control part controls and monitors operation of the AHU remotely. Interaction between the management PLC and the sensors/actuators is via a LonWorks fieldbus.

The equipment is made by ERM and marketed by Schneider Electric.

Description

**Standard version**
- Pre-filtration and filtration compartment
- Supply air compartment with sound trap
- Control cabinet with centralized building management, TAC Xenta 721 PLC, web server
- Portable operator console
- Supervisory software
- Measuring points on all the compartments

**Options**
- Water-cooling battery compartment
- Electrical heater battery compartment
- Water-heating battery compartment
- Humidifier compartment
- Heat pump for heater battery or cooling battery
- Metering compartment:
  - 1 differential pressure sensor
  - 1 temperature sensor
  - 1 relative humidity sensor
- Measuring instrument kit:
  - 1 thermometer/hygrometer
  - 1 thermometer/anemometer
  - 1 micromanometer
- Recording kit:
  - 1 reader/recorder of pressure, flow, relative humidity and temperature

Benefits
- Real system adapted for training with HVAC PLC
- Remote control and monitoring via web server
- Flexible composition depending on compartments selected

To order

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1ERMSF</td>
<td>Single-flow air handling unit</td>
</tr>
<tr>
<td>MD1ERMWT00</td>
<td>Water-cooling battery compartment</td>
</tr>
<tr>
<td>MD1ERMWT01</td>
<td>Electrical heater battery compartment</td>
</tr>
<tr>
<td>MD1ERMWT02</td>
<td>Water-heating battery compartment</td>
</tr>
<tr>
<td>MD1ERMHWH00</td>
<td>Steam humidifier compartment</td>
</tr>
<tr>
<td>MD1ERMWT05</td>
<td>Heat pump for cooling or heater battery</td>
</tr>
<tr>
<td>MD1ERMMW00</td>
<td>Metering compartment</td>
</tr>
<tr>
<td>MD1ERMMW01</td>
<td>Measuring instrument kit</td>
</tr>
<tr>
<td>MD1ERMMW02</td>
<td>Recording kit</td>
</tr>
</tbody>
</table>
Heating control bench

Learning objectives
- To understand how regulation works
- To make use of and program the control functions of a Premium PLC

Main industries
- Electrotechnical engineering
- Automation engineering
- Energy engineering

Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>230 V/2.4 kVA</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>1930 x 680 x 630 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>120 kg no-load</td>
</tr>
</tbody>
</table>

The operational side of this bench represents a scaled-down central heating installation. The control side consists of a TSX57 PLC and an HMI terminal for controlling the system. An Ethernet connection is used to control the bench remotely. The PID loops have been designed in the following configurations:
- Central heating with indoor temperature sensor and analog action on the three-way valve
- Central heating with indoor temperature sensor and discrete action on the three-way valve
- Central heating with outdoor temperature sensor and heat curve (acting on the three-way valve)

The bench is mounted on a frame with locking castors.

Operative part:
- 15 L storage water heater
- Expansion tank with safety unit
- 3-way motorized proportional action valve
- Circulator controlled by a drive
- 500 W radiator disturbed by 3 fans
- 6 temperature sensors
- Circulator voltage-current measuring points
- SP, PV, OV analog measuring points

Control part:
- 1 protection and control sequence
- 1 x 0.18 kW variable speed drive
- 1 TSX57 Premium Ethernet PLC with 8 inputs/16 outputs (discrete) and 8 inputs/8 outputs (analog)
- 1 x 10.4” colour touchscreen graphic terminal

Benefits
- Industrial control system
- Quick reaction time
- All the control loops are represented

To order
MD1AE895PR

Heating control bench

Educational Solutions Catalogue - 2015/2016
91
Energy efficiency

Air/air heat pump bench

Learning objectives
- To learn how an air/air heat pump works
- To study heat exchanges
- To study the main components: compressor, condenser, expansion valve, evaporator
- To size the evaporator and the condenser using the technical documentation
- To configure the regulator, optimization
- To test the fluid charge, influence on performance
- To study the energy consumption, T/P refrigeration cycle
- To calculate the hot/cool air/fluid COPs
- To demonstrate the energy savings achieved with a heat pump

Main industries
- Energy engineering
- Electrical engineering
- Energy engineering
- Electrotechnical engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/3.2 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>1350 x 1180 x 670 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>232 kg</td>
</tr>
</tbody>
</table>

Presentation
This air/air heat pump adapted for training purposes is created from commercially-available standard components. The heat pump is controlled by a controller. It is supplied with a building management system to acquire readings. An HMI on the front face can be used to monitor temperatures, automatic defrosting and alarms.

Description
The bench is mounted on a frame with locking castors. It consists of the following equipment:
- 2 fixed-speed fans, 160 m³/h
- Compressor, condenser, expansion valve, evaporator
- R134a refrigerant
- 2 air flowmeters
- 2 low and high pressure manometers
- 2 low and high pressure sensors
- 1 defrost solenoid valve
- 1 LED for checking the presence of gas
- 1 suction line accumulator
- 1 dehydrator on a gas supply
- 4 gas temperature sensors
- 6 air temperature sensors
- 1 evaporator defrost temperature sensor
- 1 M238 programmable controller
- 1 STU655 3.5” HMI terminal
- 1 LabVIEW application

Option
Building management software for data acquisition and processing

Benefits
- Transparent equipment allowing components to be seen
- Numerous measuring points
- 2 different operating modes: dynamic and standard

To order
MD1AAPACAA238 | Air/air heat pump with M238 pilot control
MD1AAChEPCrV | Building management software
**Twin-flow ventilation bench**

**Learning objectives**
- To study how ventilation affects air quality
- To learn about the passive exchanger and its function
- To study heat exchanges in standard mode and dynamic mode:
  - Exchanger efficiency calculation
  - Power consumption
- To demonstrate the influence of extracted air temperature and the new air temperature
- To study regulation: standard mode, regulation mode
- To compare single-flow/twin-flow operation

**Presentation**
With this twin-flow ventilation bench, both air flows which exchange their heat energy in the passive exchanger can be viewed. Different types of sensor are installed on each air flow, indicating the incoming and outgoing air temperatures and the flow rate. The air flows are variable and controlled independently (twin-flow or single-flow operation).
All this information can be found on the HMI terminal.

**Main industries**
- Electrical engineering
- Energy engineering
- Electrotechnical engineering

**Characteristics**

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/0.1 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>1350 x 1180 x 670 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>195 kg</td>
</tr>
</tbody>
</table>

**Description**
The bench is mounted on a trolley with braked castors. It consists of:
- 2 x 0-90 m³/h variable-speed fans controlled by the HMI
- 1 passive exchanger conforming to RT2012
- 2 air flowmeters
- 4 temperature sensors
- 1 CO₂ sensor
- 1 M238 programmable controller
- 1 STU655 3.5” HMI terminal
- 1 LabVIEW application

**Option**
Building management software for data acquisition and processing

**Benefits**
- Transparent equipment allowing components to be seen
- Intuitive control and interactivity of practical exercises
- Ventilation bench can be connected to the air/air heat pump bench

**To order**

<table>
<thead>
<tr>
<th>MD1AAVMC</th>
<th>Twin-flow ventilation system</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AACHEPACRV</td>
<td>Building management software</td>
</tr>
</tbody>
</table>
Building management & energy efficiency

Residential
Building management & energy efficiency
Residential

Residential VDI LEXHOME case ........................................... page 96
Residential and small business pack .................................... page 97
Residential modular offer .................................................... page 98
Energy efficiency residential and small business modular
offer .................................................................................. page 99
Energy management 3D cubicle .......................................... page 100
Energy management in the home according to RT2012 .......... page 101
Energy management in the home ........................................ page 102
Residential VDI LEXHOME case
ALVIDIS case

Learning objectives
- To distribute various media (telephone, television, Internet) on RJ45 terminal ports with the aid of a concrete specification
- To configure the system according to various scenarios
- To study and configure an IP camera

Presentation
This case is designed to demonstrate the various media distribution solutions in a residential or small business environment. It is equipped with an IP camera which can be used to create a network and remote access via a web browser.

Main industries
- Electronic engineering
- Electrical engineering
- Energy engineering

Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>To distribute various media (telephone,</td>
<td>This case is designed to demonstrate the various media distribution</td>
</tr>
<tr>
<td>television, Internet) on RJ45 terminal ports</td>
<td>solutions in a residential or small business environment.</td>
</tr>
<tr>
<td>with the aid of a concrete specification</td>
<td>It is equipped with an IP camera which can be used to create a network</td>
</tr>
<tr>
<td>To configure the system according to various</td>
<td>and remote access via a web browser.</td>
</tr>
<tr>
<td>scenarios</td>
<td></td>
</tr>
<tr>
<td>To study and configure an IP camera</td>
<td></td>
</tr>
</tbody>
</table>

Residential

ALVIDIS case

Benefits
- Compact equipment
- Numerous wiring combinations
- Can be integrated in a training VDI installation

To order
MD1ALVIDISA ALVIDIS case
Residential and small business equipment pack

Learning objectives
- To be able to read a wiring diagram, a layout drawing, manufacturer data sheets
- To be able to analyze an installation in accordance with standard NFC 15-100
- To install and wire components (professional skills)
  - To adjust components, timers
  - To test the installation
  - To create an electrical wiring file with the BatiResi software:
    - switchboard front panel
    - composition of feeders, etc.

Presentation
The residential and small business equipment pack can be used to create an electrical installation for the residential or small business sector. The switchboard, sockets and switches should be installed on partitions or in a 3D cubicle.

Main industries
- Electrotechnical engineering
- Electrical engineering
- Electrical engineering in the building sector

Characteristics

| Power supply | 230 V |
| Dimensions (H x W x D) | 990 x 1000 x 1000 mm |
| Weight | 3 kg |

Description
- 1 single-phase DB90 incoming circuit breaker
- 1 EDF subscriber meter
- 1 meter and circuit breaker control panel
- 1 switchboard with 3 rows of 13 modules
- 4 x 16 A 30 mA RCBOs
- 2 x 20 A 30 mA RCBOs
- 5 x 10 A circuit breakers, 6 x 16 A circuit breakers
- 1 impulse relay
- 1 impulse relay with central control
- 1 central control auxiliary
- 1 programmable timer switch
- 2 timers
- 1 switch-off warning
- 1 light-sensitive switch
- 1 load shedder (2 channels)
- 5 CT contactors (2 NO)
- 7 two-way switches
- 6 pushbutton switches
- 3 illuminated pushbutton switches
- 1 double pushbutton switch
- 6 x 2P+E 10/16 A domestic sockets
- 10 x 20 A cable outputs
- 50 airtight boxes 67 mm diam, 40 mm deep
- 10 ceiling boxes with lighting appliance socket
- 10 2P+E lighting appliance plugs + E27 screw-in lampholders

Benefits
- Low-cost offer
- Predefined package
- Free software

To order
MDG99120 Residential and small business pack
Residential modular offer

Learning objectives
- To set up a distribution switchboard
- To study and wire components in the 1 to 2-room housing kit:
  - 1-pole and 2-pole one-way switches, two-way switches, power socket
  - series/parallel connections
- To study and wire components in the 3 to 4-room housing kit:
  - impulse relay
  - programmable timer switch

Main industries
- Electrotechnical engineering
- Electrical engineering
- Electrical engineering in the building sector

Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>1/2-rm kit</th>
<th>3/4-rm kit</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support frame</td>
<td>1</td>
<td>1</td>
<td>MD1AM000</td>
</tr>
<tr>
<td>Circuit breaker + meter module</td>
<td>1</td>
<td>1</td>
<td>MD1AM001</td>
</tr>
<tr>
<td>10 A circuit breaker module</td>
<td>3</td>
<td>1</td>
<td>MD1AM002</td>
</tr>
<tr>
<td>16 A circuit breaker module</td>
<td>1</td>
<td>1</td>
<td>MD1AM003</td>
</tr>
<tr>
<td>16 A/30 mA residual current CB module</td>
<td>2</td>
<td>2</td>
<td>MD1AM004</td>
</tr>
<tr>
<td>20 A/30 mA residual current CB module</td>
<td>1</td>
<td>2</td>
<td>MD1AM005</td>
</tr>
<tr>
<td>Impulse relay module</td>
<td>1</td>
<td>1</td>
<td>MD1AM006</td>
</tr>
<tr>
<td>Impulse relay module (central ctrl)</td>
<td>1</td>
<td>1</td>
<td>MD1AM007</td>
</tr>
<tr>
<td>Prog. timer switch module</td>
<td>1</td>
<td>1</td>
<td>MD1AM008</td>
</tr>
<tr>
<td>Modular contactor module</td>
<td>1</td>
<td>1</td>
<td>MD1AM009</td>
</tr>
<tr>
<td>Two-way switch module</td>
<td>5</td>
<td>2</td>
<td>MD1AM014</td>
</tr>
<tr>
<td>Pushbutton module</td>
<td>6</td>
<td>6</td>
<td>MD1AM015</td>
</tr>
<tr>
<td>Double PB module</td>
<td>1</td>
<td>1</td>
<td>MD1AM017</td>
</tr>
<tr>
<td>16 A power socket module</td>
<td>4</td>
<td>2</td>
<td>MD1AM018</td>
</tr>
<tr>
<td>15 W lampholder module</td>
<td>4</td>
<td>5</td>
<td>MD1AMP004</td>
</tr>
</tbody>
</table>

To order
- MD1AM6121 1/2-room housing modular offer
- MD1AM6122 3/4-room housing modular offer

Benefits
- Quick, safe setup
- Rugged wiring on safety sockets
- Option of adding the modules described on page 99
Residential

Residential and small business offer

Energy efficiency

Learning objectives
- To optimize energy consumption through the use of suitable products:
  - programmer
  - light-sensitive switch
  - timer
  - timer switch, etc.
- To grasp the concepts of energy efficiency
- To study and wire components in the residential and business kit:
  - impulse relay with PB with LED
  - timer with switch-off warning
  - light-sensitive switch
- To study and wire components in the EE residential and small business kit:
  - motion sensor
  - thermostat with remote probe

Main industries
- Electrotechnical engineering
- Electrical engineering
- Electrical engineering in the building sector

Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>RSB kit</th>
<th>EE RSB kit</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support frame</td>
<td>1</td>
<td>1</td>
<td>MD1AM000</td>
</tr>
<tr>
<td>Circuit breaker + meter module</td>
<td>1</td>
<td>1</td>
<td>MD1AM6001</td>
</tr>
<tr>
<td>10 A circuit breaker module</td>
<td>1</td>
<td>2</td>
<td>MD1AM6002</td>
</tr>
<tr>
<td>16 A circuit breaker module</td>
<td>4</td>
<td>2</td>
<td>MD1AM6003</td>
</tr>
<tr>
<td>16 A/30 mA residual current CB module</td>
<td>1</td>
<td>1</td>
<td>MD1AM6004</td>
</tr>
<tr>
<td>Prog. timer switch module</td>
<td>1</td>
<td>1</td>
<td>MD1AM6008</td>
</tr>
<tr>
<td>Modular contactor module</td>
<td>4</td>
<td>2</td>
<td>MD1AM6009</td>
</tr>
<tr>
<td>Timer module</td>
<td>2</td>
<td>2</td>
<td>MD1AM6010</td>
</tr>
<tr>
<td>Light-sensitive switch module</td>
<td>1</td>
<td>1</td>
<td>MD1AM6012</td>
</tr>
<tr>
<td>Load shedder module, 1 channel</td>
<td>1</td>
<td>1</td>
<td>MD1AM6013</td>
</tr>
<tr>
<td>Two-way switch module</td>
<td>2</td>
<td>2</td>
<td>MD1AM6014</td>
</tr>
<tr>
<td>Pushbutton module</td>
<td>2</td>
<td>2</td>
<td>MD1AM6015</td>
</tr>
<tr>
<td>Illuminated PB module</td>
<td>3</td>
<td>3</td>
<td>MD1AM6016</td>
</tr>
<tr>
<td>16 A power socket module</td>
<td>2</td>
<td>2</td>
<td>MD1AM6018</td>
</tr>
<tr>
<td>Motion sensor module</td>
<td>1</td>
<td>1</td>
<td>MD1AM6019</td>
</tr>
<tr>
<td>Timer module with switch-off warning</td>
<td>1</td>
<td>1</td>
<td>MD1AM6020</td>
</tr>
<tr>
<td>Room temperature sensor module</td>
<td>1</td>
<td>1</td>
<td>MD1AM6029</td>
</tr>
<tr>
<td>Thermostat module</td>
<td>1</td>
<td>1</td>
<td>MD1AM6030</td>
</tr>
<tr>
<td>15 W lampholder module</td>
<td>4</td>
<td>4</td>
<td>MD1AMP004</td>
</tr>
<tr>
<td>Radiator adapted for training (OP)</td>
<td>1</td>
<td>1</td>
<td>MD1AMP010</td>
</tr>
</tbody>
</table>

Residential-small business modular offer

Benefits
- Quick, safe setup
- Rugged wiring on safety sockets
- Option of adding modules from the Modular Offer catalogue

To order
- MD1AM6123
- MD1AM6130

Presentation

The energy efficiency residential and small business modular offer can be used to study energy management in a relatively complex electrical installation, either residential or small business type.

The energy saving and optimization aspects can be illustrated on the heating and lighting functions.

Composition

The residential and small business (RSB) and energy efficiency (EE) kits consist of the modules below.
You can also order each module separately according to requirements.

Composition

- Frame 1030 x 910 x 400 mm
- Weight 6.5 kg
- Modules 245 x 150 x 70 mm
- Weight 0.7 kg

Frame 1030 x 910 x 400 mm
- Weight 6.5 kg
- Modules 245 x 150 x 70 mm
- Weight 0.7 kg
**Residential**

**Energy management 3D cubicle**

**Residential SMART HOME**

**Learning objectives**
- To establish connections and commission a home automation installation
- To configure the installation
- To manage different scenarios
- To apply the SEEN aspects of the RT2012 energy efficiency standard:
  - To measure and display data on a WISER screen
  - To metering on the various feeders: heating, lighting, water
- To apply the ACTION aspects of RT2012 via WISER:
  - Electric heating and hot water cylinder
  - Shutters and lighting

**Presentation**

The energy management 3D cubicle reproduces a residential environment so students can study and install home automation and energy management functions in accordance with the RT2012 energy efficiency standard.

2 modules can be combined to expand the possible activities. The 3D cubicle has been developed in partnership with BEMA and is marketed by Schneider Electric.

**Description**

- Mechanically-welded structure, external partitions made of FERMACEL, internal partitions made of laminate
- Window with controllable roller blind, Securit double glazing
- Metering on the main feeders via WISER LINK
- LexComHome automatic VDI patching system
- Housing service duct with the various protection devices and components needed for it to work properly
- Indoor/outdoor lighting management using radio frequency (ODACE RF and/or ODACE and/or WISER SMART)
- 1 or 2 x 750 W-1500 W radiant convection heaters
- Electric heating and hot water cylinder managed by load shedder or WISER SMART
- 1 indoor and outdoor door entry phone
- 1 presence sensor

**Main industries**
- Electrical engineering
- Electrotechnical engineering

**Characteristics**

<table>
<thead>
<tr>
<th></th>
<th>1 module</th>
<th>2 modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>230 V/700 VA</td>
<td></td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>2400 x 1375 x 1625 mm</td>
<td>2400 x 2750 x 1625 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>400 kg</td>
<td>800 kg</td>
</tr>
</tbody>
</table>

**Benefits**
- Mock-up upgraded from a wired solution to a wireless solution
- Practical exercises available in digital file format to allow students to work independently
- Openness to fibre optics

**To order**

UEHGSHR | Please consult us to define the configuration
Residential

Energy management in the home according to RT2012
WISER pack

Learning objectives
- To set up and configure the pack in the context of a teaching project simulating a home
- To study the requirements of the RT2012 energy efficiency standard
- To find solutions for reducing energy consumption
- To control the installation remotely in order to optimize consumption
- To understand the ZIGBEE protocol

Main industries
- Electrical engineering
- Electronic engineering
- Energy engineering
- Electrotechnical engineering
- Energy engineering
- Automation engineering

Characteristics
<table>
<thead>
<tr>
<th>Description</th>
<th>Power supply</th>
<th>Dimensions (H x W x D)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>230 V</td>
<td>400 x 600 x 600 mm</td>
<td>6 kg</td>
</tr>
</tbody>
</table>

Recommended configuration
- Internet connection

Description
The WISER pack is used to measure electricity consumption and control the most energy-intensive functions in a home conforming to RT2012:
- electric heating
- domestic hot water tank
- controlled sockets (lighting, electronic or household appliances, etc.)

It helps ensure compliance with article 23 of RT2012 concerning keeping occupants informed.

The components communicate with one another via the ZIGBEE protocol. The controller needs to be connected to the Internet so it can be controlled remotely.

A smartphone or tablet app can be downloaded free of charge. Data is stored in the cloud and updates are sent automatically.

Benefits
- Installation in a 3D cubicle
- Ease of installation with video tutorials
- Free firmware and app

Presentation

To order
MDG99WISER | WISER pack
### Energy management in the home

#### WISER bench

**Learning objectives**
- To analyze the energy context and the challenges of RT2012
- To size a WISER configuration to suit the home
- To set up WISER components
- To control the DHW and heating
- To measure energy consumption
- To control a power socket: possible savings and overload cut-off
- To study the ZIGBEE protocol

**Presentation**
The WISER bench helps ensure compliance with articles 23 and 24 of the RT2012 energy efficiency standard, and allows students to study controlling a home using the WISER energy management home automation solution. It can be used to measure, view and control heating, domestic hot water and power sockets.

The settings are entered locally on the WISER controller with a PC. Remote control is possible via the app on a tablet or smartphone, after connecting the controller to the school/college network.

**Description**
The WISER bench consists of 3 panels with a cascaded power supply, comprising the following devices:
- **Main panel:**
  - 1 WISER controller (on the front)
  - 2 controlled sockets
  - Wi-Fi router
  - 1 spotlight
  - 1 home switchboard (on the rear)
  - 1 hub for measuring the feeders
- **Heating panel:**
  - 1 x 500 W electric radiator
  - 1 actuator
  - 1 thermostat
- **DHW panel:**
  - 1 x 100 W immersion tank
  - 1 actuator

**Characteristics**

<table>
<thead>
<tr>
<th>Component</th>
<th>Power supply</th>
<th>Dimensions (H x W x D)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>230 V</td>
<td>Main panel 630 x 560 x 400 mm</td>
<td>8 kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Heating panel 600 x 450 x 400 mm</td>
<td>5 kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DHW panel 400 x 350 x 400 mm</td>
<td>3 kg</td>
</tr>
</tbody>
</table>

**Main industries**
- Electrical engineering
- Electronic engineering
- Energy engineering
- Electrotechnical engineering
- Energy engineering
- Automation engineering

**Benefits**
- Ease of installation with video tutorials
- Free app for smartphone or tablet
- Remote control via the school/college network

**To order**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDGWISERTPR</td>
<td>WISER main panel</td>
</tr>
<tr>
<td>MDGWISERCHF</td>
<td>WISER heating panel</td>
</tr>
<tr>
<td>MDGWISERCHE</td>
<td>WISER DHW panel</td>
</tr>
</tbody>
</table>
Industry & machines
Industry & machines

Industrial control
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Containment cabinet</td>
<td>108</td>
</tr>
<tr>
<td>Industrial component wiring bench</td>
<td>109</td>
</tr>
<tr>
<td>Motor starter packs</td>
<td>110</td>
</tr>
<tr>
<td>Motor starter modular offer</td>
<td>111</td>
</tr>
<tr>
<td>Training motors</td>
<td>112</td>
</tr>
<tr>
<td>Motor starter bench</td>
<td>113</td>
</tr>
<tr>
<td>Industrial sensors</td>
<td>114</td>
</tr>
<tr>
<td>Analog sensors and process control</td>
<td>115</td>
</tr>
<tr>
<td>Wireless industrial control</td>
<td>116</td>
</tr>
<tr>
<td>Pneumatic and electro-pneumatic panels</td>
<td>117</td>
</tr>
</tbody>
</table>
Industrial control

Containment cabinet

**Learning objectives**
- To set up an electromechanical control panel in a safe environment
- To conduct electrical tests without coming into direct contact with live parts

**Main industry**
- Electrical engineering

**Characteristics**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>400 V</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>1470 x 700 x 350 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>70 kg</td>
</tr>
</tbody>
</table>

**Presentation**
Specially designed for the prototype area in electrical engineering production workshops, this cabinet can be used to apply power to panels wired by the students safely. The test voltages (400 V and 24 VDC) are only delivered if the cabinet door is closed.

**Description**
- Key-operated switch for maintenance interventions
- Removable protection and control block
- Student panels powered by safety sockets
- Quick connection to the student control panel
- Connections to the outside via safety sockets (two motor outputs)

The containment cabinet is supplied with:
- 4 sets of Telequick plates
- 4 PVC gland plates (to be drilled) for feeding cables through, dimensions: 295 x 200 x 3 mm
- 24 removable terminals, 5-pole, female

**To order**
MD1AA685 | Containment cabinet
Industrial control

Industrial component wiring bench

Learning objectives
- To set up an electromechanical control panel in a safe environment
- To link up this panel to an operative part
- To conduct tests in complete safety

Main industries
- Electrotechnical engineering
- Electrical engineering

Presentation
This bench is made up of an electrical cabinet designed to receive a control panel created by the student, which can then be connected to various operative parts (compressor unit, fan, heaters) using industrial connectors.
The assembly is used to replicate the electrical installation in an agricultural greenhouse.
It can be powered up safely. A hinged side grille can be used to create a second control panel.
A hardware kit is available as an option for creating a control panel.

Characteristics

| Power supply | 400 V/2.2 kVA |
| Dimensions (H x W x D) | 1900 x 1050 x 750 mm |
| Weight | 140 kg |

Description
The bench is mounted on a frame with locking castors.
- Test cabinet at top:
  - equipped with a transparent door
  - pre-equipped with buttons, indicators and selector switches for controlling panels created by students
- 1 hinged panel that folds back on itself
- Lower part that takes the pre-wired operative parts

Available as an option: Hardware kit to be wired
- 1 Telequick plate
- 7 contactors and auxiliary contact blocks
- 1 thermal overload relay
- 8 thermal-magnetic circuit breakers
- 1 switch disconnector
- Cylinders
- Valves
- Electrical and pneumatic wiring accessories
- Wiring terminals

Benefits
- Mobile equipment
- 3 operative parts integrated in the bench
- Rear panel for creating the electro-pneumatics
- Works without compressed air

To order

| MD1AA200 | Industrial component wiring bench |
| MD1AA209 | Hardware kit to be wired |
Motor starter packs

Learning objectives
● To study and create the various motor starter diagrams:
  o separation or isolation
  o control or switching
  o short-circuit protection
  o overload protection
● To learn about the control gear and the different ways to set it up
● To create power switching equipment

Main industries
● Electrotechnical engineering
● Electrical engineering

Characteristics
| Power supply | 400 V |
| Dimensions [H x W x D] | 400 x 600 x 800 mm |
| Weight | 15 kg |

Description
This assembly allows electromechanical engineering students to design, mount, wire and repair power control equipment.

Presentation

Basic pack
● 1 kit comprising the plate and wiring accessories
● 1 x 24 VDC power supply kit
● 1 set of protection devices and contactors to create:
  o DOL starter
  o DOL reversing starter
  o non-reversing or reversing star-delta starter

TeSys U add-on pack
● 1 kit to create a DOL starter
● 1 integrated DOL reversing starter, modular with minimal setup

Variable speed control add-on pack
● 1 Altivar drive
● 1 soft starter
● PowerSuite software

Benefits
● Complete predefined package for all types of motor starter
● Low-cost solution

To order

| MD1AA740 | Basic motor starter pack |
| MD1AA740T | TeSys U add-on motor starter pack |
| MD1AA740V | Variable speed control add-on motor starter pack |
Motor starter modular offer

**Learning objectives**
- To study and create the various motor starter diagrams
- To learn about the control gear and the different ways to set it up

**Main industries**
- Electrotechnical engineering
- Electrical engineering

**Characteristics**

<table>
<thead>
<tr>
<th></th>
<th>Power supply</th>
<th>Control circuits</th>
<th>Dimensions (H x W x D)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>230 V/400 V 0.18 kW</td>
<td>24 VDC</td>
<td>1030 x 400 x 910 mm</td>
<td>6.5 kg</td>
</tr>
<tr>
<td>Modules</td>
<td>70 x 150 x 245 mm</td>
<td></td>
<td>0.7 kg</td>
<td></td>
</tr>
</tbody>
</table>

**Presentation**

The motor starter modular offer can be used to set up the components of a power switching device quickly, and to study electromechanical or electronic control of starter motors. The components are mounted on boxes and connected on double-recess plugs.

**Composition**

Two kits are offered: motor starter and variable speed control

Two asynchronous motors adapted for training purposes are available as an option:
- for the electrical engineering motor starter kit, the 230 V/400 V motor
- for the variable speed control kit, the 400 V/690 V motor

You can also order each module separately according to requirements.

**Electrical engineering motor starter modular offer**

- Support frame 1 MD1AM000
- TeSys U starter module 1 MD1AM1001
- Magnetic circuit breaker module 1 MD1AM1002
- Thermal-magnetic circuit breaker module 1 MD1AM1003
- Switch disconnector module 1 MD1AM1005
- Fused (off-load) isolator module 1 MD1AM1006
- Thermal overload relay module 1 MD1AM1007
- Contactor module 3 MD1AM1008
- Reversing contactor module 1 MD1AM1009
- Soft starter module 1 MD1AM1010
- Time-delay auxiliary module 1 MD1AM1012
- Machine control module 1 MD1AM7002

**Variable speed control modular offer**

- Support frame 1 MD1AM000
- 0.18 kW Altivar 312 module 1 MD1AM5001
- Thermal-magnetic protection module 1 MD1AM1004
- Variable speed drive control module 1 MD1AM7001

**Benefits**
- Quick, safe setup
- No risk of damage to control system components

**Example installation**

**To order**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AMLDM</td>
<td>Electrical engineering motor starter modular offer</td>
</tr>
<tr>
<td>MD1AMP001</td>
<td>230/400 V training asynchronous motor</td>
</tr>
<tr>
<td>MD1AMLATV312SM</td>
<td>Variable speed control motor starter modular offer</td>
</tr>
</tbody>
</table>
Training motors

Learning objectives
- To learn about the asynchronous electric motor
- To study on-load current and power
- To set up and connect the motor to the various protection and control components

Main industries
- Electrotechnical engineering
- Electrical engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>230 V/400 V</td>
<td>180 W</td>
</tr>
<tr>
<td>400 V/690 V</td>
<td>750 W</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dimensions (H x W x D)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model on castors</td>
<td>465 x 465 x 750 mm 35 kg</td>
</tr>
<tr>
<td>Table-top model</td>
<td>500 x 290 x 400 mm 20 kg</td>
</tr>
<tr>
<td>Plinth-mounted model</td>
<td>250 x 390 x 205 mm 7 kg</td>
</tr>
</tbody>
</table>

Description

Four motor models adapted for training purposes are offered to simulate different types of electromechanical equipment (blower fan, electric pump, hoisting winch, etc.).

The 0.75 kW three-phase 230 V model offers the advantage of a conventional connection behind a drive powered by a single-phase 230 V supply.

The powder brake allows a variable torque to be applied.

The 0.75 kW three-phase 400 V model allows star-delta starting from an AC supply voltage of 400 V, also with a powder brake.

The 0.18 kW three-phase 400 V models are particularly suitable for the motor starter modular offer (see page 111).

Benefits
- Quick, safe setup
- Safe, rugged wiring

To order

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AA529</td>
<td>0.75 kW 230 V/400 V training motor on castors</td>
</tr>
<tr>
<td>MD1AA529LT</td>
<td>Table-top 0.75 kW 400 V/690 V training motor</td>
</tr>
<tr>
<td>MD1AMP001</td>
<td>Plinth-mounted 0.18 kW 230 V/400 V training motor</td>
</tr>
<tr>
<td>MDTAMP013</td>
<td>Plinth-mounted 0.18 kW 400 V/690 V training motor</td>
</tr>
</tbody>
</table>
Motor starter bench

Learning objectives

- To implement the most commonly used diagrams:
  - DOL starting
  - Star-delta starting
  - Reversing starting
  - Starting with electronic starter
- To connect the power switching components:
  - Switch
  - Isolator
  - Contactor
  - Thermal overload relay
  - Compact TeSys U starter
- To measure the circuit voltages and currents
- To calculate the torque, power and energy involved
- To connect the power switching components
- To study protection devices

Main industries

- Electrical engineering
- Electromechanical engineering

Characteristics

| Power supply | 400 V/2 kVA |
| Dimensions (H x W x D) | 1950 x 700 x 700 mm |
| Weight | 190 kg |

Description

This bench can be used to study the various electromechanical and electronic motor starter diagrams. Motor starters are made up of basic functions such as the Vario switch, LS1D isolator, LC1/LC2 contactors, class 10 LRD thermal overload relay; or alternatively multiple or integrated functions such as the GV2 circuit breaker, Integral 18, TeSys U motor starter or ATS01 starter.

To order

MD1AA540 | Motor starter bench

Benefits

- Mobile equipment
- Both sides can be used at the same time
- Safe, rugged wiring

Presentation

This bench can be used to study the various electromechanical and electronic motor starter diagrams. Motor starters are made up of basic functions such as the Vario switch, LS1D isolator, LC1/LC2 contactors, class 10 LRD thermal overload relay; or alternatively multiple or integrated functions such as the GV2 circuit breaker, Integral 18, TeSys U motor starter or ATS01 starter.

Main industries

- Electrical engineering
- Electromechanical engineering

Characteristics

| Power supply | 400 V/2 kVA |
| Dimensions (H x W x D) | 1950 x 700 x 700 mm |
| Weight | 190 kg |

Description

The bench is mounted on a frame with locking castors and consists of two separate autonomous working sides, with industrial components connected to safety sockets:

- 1 side for analyzing and connecting the power circuit
- 1 side for analyzing and connecting the power and control circuits

The lower part contains:

- 2 groups (230 VAC - 185 W motor/190 VDC - 280 W generator)
- 2 controllable load rheostats
- 1 voltmeter
- Ammeters on each motor phase and for the load
- 1 set of safety leads

To order

MD1AA540 | Motor starter bench

Benefits

- Mobile equipment
- Both sides can be used at the same time
- Safe, rugged wiring
Industrial control

Industrial sensors
Detection workshop

Learning objectives
- To learn about the different technologies used in industrial detection:
  - Photoelectric sensors (thru-beam, reflex, fibre optic, background suppression, etc.)
  - Inductive and capacitive sensors for detecting different materials
  - Detection of linear or rotary movement by limit switches
- To set up sensors
- To make adjustments
- To debug a detection system

Main industries
- Electrotechnical engineering
- Mechanical engineering
- Industrial maintenance

Characteristics

<table>
<thead>
<tr>
<th>Power supply unit</th>
<th>230 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>170 x 260 x 230 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>5 kg</td>
</tr>
<tr>
<td>Grooved plate</td>
<td>80 x 760 x 460 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>8 kg</td>
</tr>
<tr>
<td>Accessory and target case</td>
<td>130 x 420 x 380 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>8 kg</td>
</tr>
</tbody>
</table>

Description

This detection workshop is designed to study the principles of industrial detection. The different types of sensor and target offered are typical of devices found in industry. The power supply unit is equipped with indicators to display the sensor status. The grooved plate and accessories case are used to mount, dismantle and position the sensors and targets quickly, as well as to measure sensing distances and detection angles.

Grooved plate
- Aluminium grooved support plate:
  - X axis: 600 mm stroke
  - Y axis: 460 mm long

Accessories case
- 2 quick-release vices with finely adjustable screw tightening
- 2 vice-raising supports (for the reflectors)
- 1 vice with a 75 opening and screw tightening (to hold the targets)
- 1 x 15°, 30°, 45°, 90° cam
- 1 set of steel, aluminium and brass targets for inductive sensors
- 1 set of colour-reflecting targets made of aluminium, cardboard, reflecting strip, glass, mirror, neutral
- 1 set of cylindrical reflectors and targets
- 1 set of coloured labels

Pre-wired sensor case
- 1 set of photoelectric sensors (proximity, reflex, thru-beam)
- 1 set of inductive and capacitive sensors (2/3-wire technology)
- 1 set of limit switches

Regulated power supply unit
- 0-24 V variable DC voltage (sensor power supply)
- Sensors connected to safety sockets
- Indicators-loads (actual loads for 100 mA/24 V and 20 mA/24 V)

Sensor kit
- 3 photoelectric sensors (for reading marks and labels and detecting colours)

Benefits
- Study of the main detection technologies
- Dedicated detection 24 V power supply unit
- Safe, rugged wiring

To order

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AA500</td>
<td>Grooved plate and accessories case</td>
</tr>
<tr>
<td>MD1AA502</td>
<td>Sensor case</td>
</tr>
<tr>
<td>MD1ACAVR</td>
<td>Power supply unit</td>
</tr>
<tr>
<td>MD1AA509</td>
<td>Sensor kit</td>
</tr>
</tbody>
</table>
Industrial control

Analog sensors and process control
Measurement and process control case

Learning objectives
- To study and set up various analog measurement sensors
- To analyze the associated electrical and electronic assemblies
- To study analog/digital and digital/analog conversions
- To understand PID control

Main industries
- Electronic engineering
- Automation engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/130 VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>560 x 470 x 330 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>20 kg</td>
</tr>
</tbody>
</table>

Description
- 1 strain gauge
- 1 industrial analog photoelectric sensor
- 1 linear potentiometer
- 1 variable speed motor mechanically connected to a tachogenerator
- 1 mini-enclosing guard equipped with:
  - Lamp heating system
  - Fan
  - Temperature measurement via PT100 probe and transmitter
- 1 TSX Micro PLC with 16 inputs/12 outputs (discrete), 8 inputs/2 outputs (analog)
- Measuring points and discrete I/O routed via safety sockets
- 1 Magelis-type terminal
- Predefined PL7 runtime screens
- Ethernet connection with ETZ510 module and HTML pages
- PC application program for viewing speed and temperature curves

Presentation
The measurement and process control case incorporates five practice workstations:
- Weight measurement (plastic, aluminium or steel)
- Contactless distance measurement
- Contact distance measurement
- Speed control
- Heat control

A TSX Micro PLC is used to manage and run the workstations. The PLC discrete inputs and outputs and the various measuring points can also be used on using safety sockets. An application program provided allows the speed and temperature trend curves to be displayed on a PC.

Benefits
- Complete analog measurement subsystem for control systems
- Compact equipment
- Quick installation

To order
MD1AA620 | Measurement and process control case
Industrial control

Wireless industrial control
Biometric ZIGBEE case

Learning objectives
- To study systems that communicate using ZIGBEE protocol
- To set up an industrial ZIGBEE solution
- To compare wired and wireless solutions
- To study biometric control

Main industries
- Sustainable development and environment engineering
- Electrotechnical engineering
- Industrial maintenance
- Electronic engineering

Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>Power supply</th>
<th>Dimensions (H x W x D)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>To order</td>
<td>230 V</td>
<td>130 x 350 x 380 mm</td>
<td>3.5 kg</td>
</tr>
</tbody>
</table>

Presentation
This training case can be used to practise setting up communicating industrial products with a ZIGBEE greenpower compatible protocol operating wirelessly and without a battery. A dongle is provided to analyze the ZIGBEE frames transmitted by the ZIGBEE buttons to the receiver on a PC. A biometric enable button authorizes operation of the key press represented on the diagram.

Description
- 4 mimic diagrams animated by wired or wireless ZIGBEE solutions
- Receiver boxes
- ZIGBEE PB
- Wired PBs
- 1 parameter-setting simulator

Benefits
- Comparison of control technologies

To order
MD1AAVZIGBEEB | Biometric ZIGBEE case
Industrial control

Pneumatic and electro-pneumatic panels
DIDAFLEX panelboards

Learning objectives
- To study pneumatic and electro-pneumatic technologies
- To set up and control pneumatic automation system functions
- To wire up electro-pneumatic components

Main industries
- Electrotechnical engineering
- Automation engineering
- Industrial maintenance

Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>MD1PMXZTW</th>
<th>MD1PMXTSX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>24 VDC/230 V</td>
<td></td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>600 x 450 x 250 mm</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>25 kg</td>
<td></td>
</tr>
<tr>
<td>Compressed air</td>
<td>6 bar</td>
<td></td>
</tr>
</tbody>
</table>

Composition
The composition of both DIDAFLEX kits is described in the table below.

- Pneumatic-electric interface
- Pneumatic limit switch sensor with rollers
- Electric limit switch sensor with rollers
- Magnetic cylinder position sensor
- Monostable 3/2 solenoid valve
- Monostable 4/2 solenoid valve
- Bistable 4/2 solenoid valve
- Single-acting cylinder D16-C50 mm
- Double-acting cylinder D16-C100 with 2 sensors
- Double-acting cylinder 16-C100 mm
- Magnetic panelboard with stand
- Control station 1ES-2PB-1C3P + 1 green indicator
- Isolating valve + regulator
- Double 3/2 solenoid valve

Benefits
- Combination of electro-pneumatic functions and components
- Flexible use
- No mechanical risk of trapping fingers

Presentation
The DIDAFLEX offer consists of a magnetic panelboard with illustrations for the pneumatic functions, and pneumatic components on magnetic material. This makes it easy to switch from studying the schematic diagram to actually creating a pneumatic circuit.

DIDAFLEX can be used to study and set up single-acting and double-acting cylinders, monostable or bistable solenoid valves, all controlled by an industrial PLC.

Two DIDAFLEX kits are provided for working with the panel-mounted PLCs illustrated on page 143: Zelio and Twido or TSX37, TSX57 and M340.

The equipment is made by PARKER and marketed by Schneider Electric.

To order

| DIDAFLEX for use with Zelio and Twido training PLCs | MD1PMXZTW |
| DIDAFLEX for use with TSX Micro, Premium and M340 training PLCs | MD1PMXTSX |
Industry & machines

Variable speed control & motion control
Industry & machines
Variable speed control & motion control

Electronic starter packs ................................................ page 120
Variable speed drive packs ........................................ page 121
Servo motor packs ......................................................... page 122
Linear axis packs ........................................................ page 123
Variable speed drive training cabinets ......................... page 124
ALTIVAR 32 case ........................................................ page 125
Load testing bench with asynchronous motors .............. page 126
Variable speed bench with motor ................................ page 127
Variable speed bench with powder brake ...................... page 128
Brushless training case ............................................... page 129
Mini-hoisting bench with cable winch ......................... page 130
Hoisting bench with vector control ............................... page 131
X and Z axis bench ...................................................... page 132
Hoisting crane with winch ............................................ page 133
**Variable speed control and motion control**

**Electronic starter packs**

**Learning objectives**
- To study and set up electronic motor starters
- To configure an electronic starter
- To set up Modbus or Ethernet industrial communication

**Main industries**
- Electrical engineering
- Electrotechnical engineering
- Automation engineering

**Characteristics**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power supply</strong></td>
<td>230 or 400 V</td>
</tr>
<tr>
<td><strong>Dimensions (H x W x D)</strong></td>
<td>600 x 600 x 600 mm</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>8 kg</td>
</tr>
</tbody>
</table>

**Description**

The packs consist of:

**Altistart 01**
- 1 x 6 A/230-400 V starter
- 1 TeSys U motor starter with protection unit for a 1.1 to 4 kW motor

**Altistart 22**
- 1 x 15 A/230-400 V starter
- 1 GV3L magnetic circuit breaker
- 1 line contactor
- 1 SoMove software program
- 1 PC connecting cable

**Altistart 48**
- 1 x 17 A/230-400 V starter
- 1 GV3L magnetic circuit breaker
- 1 line contactor
- 1 Ethernet gateway
- 1 Modbus drop cable
- 1 PowerSuite software pack

**Presentation**

These three packs can be used to familiarize students with the various types of electronic starter: Altistart 01, 22 and 48.

The ATS01 is designed for simple conveying applications. It controls the motor on 2 phases and can start and decelerate the equipment.

The ATS22 is designed for pumping, ventilation and compression applications. It controls the motor on 3 phases. It incorporates the Bypass control sequence, and a motor protection device. It communicates via Modbus.

The ATS48 is designed for pumping, ventilation, compression and high-torque applications. It controls the motor on 3 phases. It incorporates numerous sophisticated functions such as catch on the fly, smoke extraction, automatic restarting, etc. It communicates via Modbus.

**To order**

<table>
<thead>
<tr>
<th>MD1APATS01</th>
<th>Altistart 01 soft starter pack</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1APATS22</td>
<td>Altistart 22 soft start-soft stop pack</td>
</tr>
<tr>
<td>MD1APATS48</td>
<td>Altistart 48 soft start-soft stop pack</td>
</tr>
</tbody>
</table>

**Benefits**

- Low-cost solution
- Complete predefined package
Variable speed control and motion control

Variable speed control packs

Learning objectives
- To study and set up electronic motor starters
- To configure an electronic drive
- To use SoMove software
- To set up Modbus or Ethernet industrial communication

Main industries
- Electrical engineering
- Electrotechnical engineering
- Automation engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/400 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>400 x 400 x 400 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>6 kg</td>
</tr>
</tbody>
</table>

Presentation

The ATV12 is a compact drive for controlling simple applications. It is powered by a single-phase or three-phase 230 V supply. It communicates via serial Modbus link.

The ATV312 is a compact drive for controlling a motor with sophisticated functions such as auto-tuning. It is powered by a single-phase 230 V or three-phase 400 V supply. It communicates via Modbus and CANopen.

The ATV71 is a high-end drive with graphic interface, powered by a single-phase 230 V or three-phase 400 V supply and communicates via Modbus, CANopen and Ethernet.

The ATV32 is a drive in book format which incorporates safety functions. It is powered by a single-phase 230 V or three-phase 400 V supply. It communicates via Modbus, CANopen and EtherCAT.

Description

The packs consist of:

Altivar 12
- 1 x 1.5 kW single-phase or three-phase drive
- 1 DVD containing the technical documentation and SoMove Lite software
- 1 PC connecting cable

Altivar 312
- 1 x 1.5 kW single-phase or three-phase drive
- 1 DVD containing the technical documentation and SoMove Lite software
- 1 PC connecting cable
- 1 Ethernet gateway
- 1 Modbus drop cable

Altivar 71
- 1 x 1.5 kW single-phase or three-phase drive
- 1 Ethernet card
- 1 RJ45 cable and 1 RS232/RS485 converter

Altivar 32
- 1 x 1.5 kW single-phase or three-phase drive
- 1 Ethernet card
- 1 Ethernet cable
- 1 USB Bluetooth adaptor

Benefits

- Low-cost solution
- Complete predefined package
- Guided introduction

To order

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1APATV12M</td>
<td>Altivar 12 single-phase 230 V drive pack</td>
</tr>
<tr>
<td>MD1APATV12T</td>
<td>Altivar 12 three-phase 230 V drive pack</td>
</tr>
<tr>
<td>MD1APATV312M</td>
<td>Altivar 312 single-phase 230 V drive pack</td>
</tr>
<tr>
<td>MD1APATV312T</td>
<td>Altivar 312 three-phase 400 V drive pack</td>
</tr>
<tr>
<td>MD1APATVM</td>
<td>Altivar 71 single-phase 230 V drive pack</td>
</tr>
<tr>
<td>MD1APATVT</td>
<td>Altivar 71 three-phase 400 V drive pack</td>
</tr>
<tr>
<td>MD1APATV32M</td>
<td>Altivar 32 single-phase 230 V drive pack</td>
</tr>
<tr>
<td>MD1APATV32T</td>
<td>Altivar 32 three-phase 400 V drive pack</td>
</tr>
</tbody>
</table>
Variable speed control and motion control

Servo motor packs

Learning objectives
- To make technical choices concerning velocity/position control/dimensions
- To study mechanical calculation of an axis
- To set up products
- To configure the axis with SoMove
- To set up the CANopen bus

Presentation
These packs are used to create a project involving an axis control application. Two types of pack are offered: either with a flux vector drive for velocity control, or with a servo drive for position control. The packs can be combined with a brushless servo motor. A solution with the drive integrated in the motor is also available.

Main industries
- Automation engineering
- Electrotechnical engineering

Characteristics

| Power supply | 230 V or 400 V |
| Dimensions (H x W x D) | 400 x 400 x 600 mm |
| Weight | 7 kg |

Description
The packs consist of:

LEXIUM 32 servo drive
- 1 x 6 A single-phase or three-phase LEXIUM 32
- 1 CANopen communication card
- 1 set of power and control cables
- 1 PC/ATV32 programming cable

ALTIVAR 32 with motor
- 1 x 0.75 kW single-phase ALTIVAR 32
- 1 CANopen communication card
- 1 BMH motor 1.4 N.m 350 W, 2500 rpm max.
- 1 set of cables

LEXIUM 32 with motor
- 1 x 9 A single-phase LEXIUM 32
- 1 CANopen communication card
- 1 BSH motor 0.8 N.m 250 W, 3000 rpm
- 1 set of cables

LEXIUM 32i integrated in the motor
- 1 BMI motor 2.2 N.m 700 W, 3200 rpm with LEXIUM 32i
- 1 CANopen communication card
- 1 set of cables and accessories

Benefits
- Low-cost solutions
- Predefined packages
- Free SoMove software

To order

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1APLX32M</td>
<td>Single-phase LEXIUM 32 pack</td>
</tr>
<tr>
<td>MD1APLX32T</td>
<td>Three-phase LEXIUM 32 pack</td>
</tr>
<tr>
<td>MD1APMTATV32</td>
<td>Single-phase ALTIVAR 32 with motor pack</td>
</tr>
<tr>
<td>MD1APMTLX32</td>
<td>Single-phase LEXIUM 32 with motor pack</td>
</tr>
<tr>
<td>MD1APMTLXI</td>
<td>LEXIUM 32i integrated in the motor pack</td>
</tr>
</tbody>
</table>
Variable speed control and motion control

Linear axis packs

Learning objectives
- To make technical choices concerning velocity/position control/dimensions
- To study mechanical calculation of an axis
- To set up products
- To configure axes with SoMove
- To set up the CANopen bus
- To manage limit switch safety interlocks
- To create a reference point and perform a jog type manual command
- To learn about automated control of movements and synchronize axes

Main industries
- Automation engineering
- Electrotechnical engineering

Characteristics

| Power supply | 230 V |
| Dimensions (H x W x D) | 400 x 600 x 1200 mm |
| Weight | 10 kg |

Description
Packs with one or two axes can be used to build a machine with robotic movements. They consist of one or more linear motion axes, with the carriage driven by a notched belt and guided by rollers. The packs are supplied with brushless motors already mounted.

Presentation
To order

| MD1APMT32PAS | Linear axis with motor and drive |
| MD1APMTMAX2 | 2-axis robot with motors |
| MD1APMT32MAX2 | 2-axis robot with motors and drives |
Variable speed control and motion control

Variable speed drive training cabinets

Learning objectives
● To learn how a variable speed drive works in principle
● To study and set up a variable speed drive
● To use the terminal and drive functions:
  ○ display
  ○ adjustment
  ○ configuration, etc.

Presentation
Enclosed variable speed drives adapted for teaching purposes are designed for connection to teaching motor benches, or to the load testing bench of an asynchronous motor (see page 126). They are available in ATV312 and ATV71 versions.

Main industry
● Electrotechnical engineering

Characteristics

| Power supply | 240 V single-phase or three-phase, or 400 V three-phase |
| Dimensions (H x W x D) | ATV312 cabinet 330 x 320 x 220 mm 5 kg |
| Weight | ATV71 cabinet 430 x 400 x 250 mm 8 kg |

ATV312 cabinet
● A 0.37 kW/230 V or 1.5 kW/400 V drive
● A set of safety leads
● PowerSuite parameter-setting software with cables

ATV71 cabinet
● A 0.37 kW/400 V or 1.5 kW/400 V drive
● A set of safety leads
● PowerSuite parameter-setting software with cables

It is possible to change the drive range, depending on the quantity required.

Benefits
● Ready-to-use drive
● Safe, rugged wiring
● Can be used with the MD1AA595 bench

To order

| MD1AA31W03M2 | Training Altivar 312, 0.37 kW, 230 V single-phase |
| MD1AA31W15N4 | Training Altivar 312, 1.5 kW, 400 V three-phase |
| MD1AA71W03M3 | Training Altivar 71, 0.37 kW, 230 V three-phase |
| MD1AA71W15N4 | Training Altivar 71, 1.5 kW, 400 V three-phase |
ALTIVAR 32 case
ATV32 case

Learning objectives
- To learn how a frequency inverter for three-phase asynchronous and synchronous motors works in principle
- To study and set up a variable speed drive
- To examine standard or user-defined configurations in greater depth
- To explore factory or manufacturer settings
- To optimize servo control, by adjusting the switching frequency
- To study the application-specific functions:
  - conveying
  - cutting
  - hoisting, etc.
- To use the SoMove setup and runtime software:
  - preparing configurations
  - commissioning the installation
  - maintenance

Main industries
- Energy engineering
- Electrotechnical engineering

Characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>230 V/180 W</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>275 x 430 x 400 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>16.5 kg</td>
</tr>
</tbody>
</table>

Benefits
- Drive set up in book format
- Compact equipment
- Teaching based on SoMove software

Presentation
The ATV 32 case can be used to set up the drive with a motor. Two versions are available, with an asynchronous or permanent magnet synchronous motor. The ATV32 drive can control both types of motor. It has a Bluetooth port and can be controlled by adding kit VW3A8115. SoMove software is used in the practical exercises to configure the drive.

Description
Both versions of the case contain:
- 1 tilting panel with an 0.18 kW ATV32
- 1 protection sequence
- Control inputs on switches and potentiometers
- 2 indicators: drive ready and speed reached
- Connection points for external motor
- SoMove parameter-setting software

To order
MD2ATV32FA  ATV32 case for asynchronous motor
MD2ATV32FS  ATV32 case for synchronous motor
Variable speed control and motion control

Load testing bench with asynchronous motors

Load testing bench

Learning objectives

● To learn about the various types of mechanical load: pump, fan, hoist, conveyor, etc.
● To work on the various types of torque: constant, linear, quadratic, hyperbolic, manual

Main industry

● Electrotechnical engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/400 VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>600 x 850 x 550 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>55 kg</td>
</tr>
</tbody>
</table>

Presentation

The load testing bench is used to study the various types of torque found in specific applications, in particular constant, linear, quadratic and hyperbolic torque. It can be used to control resistive torque manually. The bench incorporates two motors connected opposite one another. One is controlled by the internal drive, the other by a drive external to the bench. This drive should be rated between 0.18 kW and 0.37 kW. It is possible to use the enclosed drives on page 124.

Description

● 1 x 370 W motor with encoder, controlled by the ATV71 internal drive with Controller Inside card
● 1 x 180 W/230-400 V motor with encoder, controlled by an external drive, or an enclosed drive
● 1 braking resistor
● 1 mechanical brake
● 1 mimic diagram with:
  ○ measuring points
  ○ 6 fault switches
  ○ control inputs
  ○ selector switches and potentiometers

Benefits

● Study of all types of drive torque
● Compatible with all types of drive

To order

MD1AA595

Load testing bench with Altivar cabinet (to be ordered separately)
Variable speed control and motion control

Variable speed bench with motor

Learning objectives
- To control an asynchronous motor
- To learn how a drive works
- To set up an electronic drive:
  - wiring the motor part
  - wiring the control part
  - standard settings

Main industry
- Electrotechnical engineering

Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>230 V/500 VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>230 V/500 VA</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>500 x 790 x 480 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>40 kg</td>
</tr>
</tbody>
</table>

Presentation
This bench can be used to study and set up control of an asynchronous motor with brake. The mimic diagram includes measuring points upstream and downstream of the drive, and internal points on the DC bus. The power and control sequence is pre-wired on double-recess plugs. Safety leads are supplied with the bench.

To order

To order: MD1AA580FP

Variable speed bench with motor

Benefits
- Access to the drive internal measuring points
- Rugged wiring on safety sockets
- Adjustable brake for resistive torque

Main industry
- Electrotechnical engineering
Variable speed control and motion control

Variable speed bench with powder brake

**Learning objectives**
- To control an asynchronous motor with a frequency inverter
- To configure a drive
- To study thermal protection
- To study the torque/speed profiles by simulating various mechanical loads
- To analyze behaviour in the braking phase

**Presentation**
This bench can be used to study a drive solution for an asynchronous motor, by simulating various types of mechanical load called constant, proportional or quadratic torque (pump, fan, hoist etc.). A switch can be used to simulate simple breakdowns to make use of the Altivar diagnostic information.

**Description**
The bench is mounted on a frame with locking castors. It consists of:
- 1 x 1.5 kW asynchronous motor with inertia wheel and powder brake
- 1 x 1.5 kW 400 V Altivar 71 drive with braking resistor
- 1 TSX Micro PLC for controlling various types of load
- 1 drive control sequence (selector switches and indicator lights)
- Measuring points on safety sockets for reading the following information:
  - AC supply voltage and current
  - motor voltage and current
  - motor temperature (PT100 probe)
  - speed feedback voltage
  - powder brake torque

**Main industry**
- Electrotechnical engineering

**Characteristics**

<table>
<thead>
<tr>
<th>Power supply</th>
<th>400 V/2 kVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>1460 x 675 x 775 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>143 kg</td>
</tr>
</tbody>
</table>

**Benefits**
- Complete mobile package: motor, brake, drive
- Safe, rugged wiring
- Study of the various mechanical torques

**To order**
MD1AA570  Altivar bench with powder brake
Variable speed control and motion control

Brushless training case

Learning objectives

● To analyze a system incorporating a brushless motor
● To study and configure servo control
● In terms of position control
● To study and configure servo control
● In terms of speed control

Presentation

This case can be used to observe and study a motion system. It consists of a linear motion axis and a fixed brushless motor-drive. The aim is to control a movement in open loop and then in closed loop mode.

A laser pointing system can be used to highlight any problems and performance issues in the axis control positioning. An HMI is used to display the motion curves, which can be transferred to a spreadsheet.

Description

● 1 x 100 mm linear axis with a notched belt and rollers
● 1 x 5 A, 0.26 Nm brushless motor with integrated Lexium drive, planetary gearbox and single-turn encoder (16,384 points)
● 1 x 3.5" touchscreen graphic terminal
● 1 Twido PLC with CANopen communication card
● 1 RJ45 cable for PC connection

Main industries

● Energy engineering
● Electrotechnical engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/610 VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>270 x 650 x 400 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>25 kg</td>
</tr>
</tbody>
</table>

Benefits

● Compact brushless training case
● Teaching based on industrial applications
● Data can be viewed on display unit and PC

To order

MD1AAVBRUSH | Brushless training case
Variable speed control and motion control

Mini-hoisting bench with cable winch
ML03 bench

Learning objectives
- To study a movement made by a cable winch, with the load suspended directly overhead
- To create control panels
- To run tests and make adjustments
- To analyze motor current and voltage measurements, depending on the load being hoisted

Main industries
- Electrotechnical engineering
- Electrical engineering

Presentation
This bench is designed for panel wiring exercises that can be performed by the students, as per the diagrams supplied by the manufacturer. It can be used to show how the winch drive chain works, as well as its limit switch and overtravel system and the role of a rope drive in hoisting. The control cabinet is ready-assembled for a DOL starting sequence. The variant with M221 PLC can be used to connect an LV switchboard via the Ethernet network.

The equipment is made by LEDENT and marketed by Schneider Electric.

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>400 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>1870 x 750 x 900 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>220 kg</td>
</tr>
</tbody>
</table>

Description

Industrial type cable winch, stroke 1 m, speed 10 m/mm
- 1 x 250 W asynchronous motor, velocity 1450 rpm
- 1 gearbox with reversible parallel shafts
- 1 holding brake certified for hoisting
- System of top and bottom limit switches
- Top and bottom safety overtravel limit
- Grooved winch drum with:
  - 1 anti-twist cable equipped with a safety hook
  - 1 basket with safety latch
  - 5 x 10 kg weights
- Rope drive
- Mechanically-welded steel frame
- Steel protection unit

Control cabinet
- Equipped at the top with a safety loop that the students cannot access:
  - device containing the operative part power supply, connection to the overtravel limits, the PREVENTA safety module, the emergency stop, the 30 mA circuit breaker and the phase controller
  - Equipped at the bottom with a 550 x 450 mm panel wired for DOL starting via a terminal block
  - 1 overhead crane type pendant control station

Variant
A panel wired with the ATV312 drive (certified for hoisting), an M221 PLC for communicating via Ethernet with an LV switchboard.

Benefits
- Safety management via limit switches, overtravel limit and hoisting brake
- System can be used for wiring operations
- Separate safety and power parts for compliance with safety standards

To order

| MD1AA400ML03M | Mini-hoisting bench with DOL starting |
| MD1AA400ML03TAM | Mini-hoisting bench with PLC and drive |
**Variable speed control and motion control**

**Hoisting bench with vector control**

**SL71 bench**

### Learning objectives
- To study dynamics, torque, inertia, elongation and the bounce effect
- To select a motor, define a duty factor, analyze the network and consumption
- To measure, configure and study communication and connection to the LV switchboard
- To study the system architecture, programming and human-machine interface
- To change a configuration with/without rope drive, send a command directly or with a load sensor
- To study a hoist, calculation and selection of components, sizing and construction rules
- To analyze safety, calculation of protections, associated directives and standards

### Presentation
This winch hoisting bench is designed to assess the behaviour of an asynchronous motor in a load hoisting scenario. The system highlights the advantage of using a flux vector drive configured in open loop mode, as compared to an open loop drive (unstable at zero setpoint). The bench is available in 2 versions:
- DOL starting and open loop variable speed control to compare the two solutions
- Closed loop variable speed control with load sensor and rope drive

The load sensor is used to compare the load measurement with that calculated by the drive. Thanks to the rope drive, the user has more time to record the measurements.

The equipment is made by LEDENT and marketed by Schneider Electric.

### Main industries
- Electrical engineering
- Electrotechnical engineering

### Characteristics

| Power supply: 400 V | Dimensions (H x W x D): 2400 x 1400 x 1400 mm | Weight: 750 kg |

### Description
Operative part stroke 1.6 m, velocity from 0 to 33 m/mm
- 1 x 1.5 kW geared motor with brake, 1500 rpm, PTC probes, 1024-point encoder
- Winch with 150 kg capacity with steel cable and safety hook
- System of limit switches and overtravel limits
- 100-point incremental encoder for measuring the load velocity and displacement
- 1 basket with a capacity of 7 x 20 kg weights, protected by a steel cage

**Control part**
- 1 cabinet with transparent door, incorporating the safety system at the top and the control panel at the bottom:
  - 1 x 1.5 kW ATV 71
  - 1 braking resistor
  - 1 control desk on the cabinet side, comprising:
    - 1 speed display and 1 load display
    - the drive and motor voltage and current measuring points
    - the encoder and motor temperature measuring points

**Variant**
- Bench with load sensors, rope drive and forced ventilation

### To order

| MD1AA400SL71DM | ATV71 hoisting bench with DOL starting and drive, plus commissioning |
| MD1AA400SL71CVM | ATV71 hoisting bench with drive, load sensor, forced ventilation and rope drive, plus commissioning |

**Benefits**
- Highly dynamic operation
- Advantage of flux vector control
- Safe for students to use

---

**Schneider Electric**
Variable speed control and motion control

X and Z axis bench

Learning objectives
- To analyze dynamics, torque, inertia, electrical and mechanical measurements
- To study motor selection, duty factors and consumption
- To measure, configure, communicate and connect to an LV switchboard
- To study the system architecture, programming and the human-machine interface
- To learn about calculation and selection of components, sizing and construction rules
- To study safety, calculation of protections, associated directives and standards

Main industry
- Electrotechnical engineering

Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Power supply</th>
<th>Dimensions (H x W x D)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operative part</td>
<td>400 V</td>
<td>2150 x 1780 x 800 mm</td>
<td>300 kg</td>
</tr>
<tr>
<td>Control part</td>
<td>1788 x 800 x 600 mm</td>
<td>80 kg</td>
<td></td>
</tr>
</tbody>
</table>

Description

This system is typical of industrial machines whose load varies during the operating cycle. It can be used for a comparative study of servo loop commands between an asynchronous motor with flux vector control and a brushless motor. Depending on the position of the beam, horizontal, tilted or vertical, the motor needs to adapt its duty factor to drive the motor platform. The system operates in open loop or closed loop mode (velocity and position).

The equipment is made by LEDENT and marketed by Schneider Electric.

Operative part stroke 1.5 m, speed from 0 to 20 m/min
- 1 x 0.37 kW geared motor with brake and 1024-point encoder
- 1 moving motor platform, turning on a ball-bearing runner and mounted on a tilting beam. The platform can be loaded with up to 60 kg.
- Rack and pinion drive system with:
  - 1 x 20 N.m torque meter
  - 1 x 2048-point incremental encoder

Control part
- A cabinet with transparent door incorporating the safety system at the top and the control panel at the bottom
- 1 ATV71 drive with encoder card, Ethernet card and controller card
- 1 control desk on the cabinet side, comprising:
  - 1 speed display and 1 load display
  - command buttons and indicators
  - drive and motor voltage and current measuring points
  - encoder measuring points and drive setpoint
- Data read on BNC plugs:
  - speed and distance from the 2048-point encoder
  - force from the torque meter

Benefits
- Highly dynamic operation
- Comparison of process control commands
- Safe for students to use

To order

<table>
<thead>
<tr>
<th>Reference</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AA410AXZ01M</td>
<td>X and Z axis bench</td>
</tr>
<tr>
<td>MD1AA410AZ02AM</td>
<td>FVC version of Z axis bench with commissioning</td>
</tr>
<tr>
<td>MD1AA410AZ02BM</td>
<td>Brushless version of Z axis bench with commissioning</td>
</tr>
</tbody>
</table>
**Variable speed control and motion control**

**Winch hoisting crane**

### Learning objectives
- To study dynamics, acceleration or deceleration during travel, the sway effect and the rope drive
- To create control panels and perform wiring
- To program a communicating PLC, configure a variable frequency drive
- To describe a drive chain, service and repair it
- To analyze the structure, sizing and construction rules, selection of components
- To study sway, construction standards, associated directives and accreditations

### Presentation

The winch hoisting crane is typical of handling applications with associated motors. Its height and length mean it can be used to test the problem of sway without risking knocking into the frame. A containment cabinet is used to mount interchangeable panels, pre-wired or for wiring by the students. The equipment is made by LEDENT and marketed by Schneider Electric.

### Description

**Operative part** stroke 1.80 x 2.50 m, speed 20 m/min
- Removable mechanically-welded steel frame, epoxy paint
- Winch with 100 kg capacity, stroke with hook 1.5 m, with weight 1.2 m. Driven by 0.37 kW geared motor with brake, reversible parallel shafts, equipped with two limit switches and two overtravel limits.
- Encoder adaptation.
- Load hoisted directly or by rope drive. Supplied with 1 basket and 8 x 10 kg weights.
- Translational movement on a carriage with 0.25 kW geared brake motor. Rack and pinion system and guide rail. System of 2 limit switches and 2 overtravel limits
- Safety cabinet:
  - AC power supply incomer, padlockable isolating switch, 30 mA RCBO, phase control, safety relay, emergency stop and indicators 30 mA, phase control, safety relay, emergency stop and indicators

**Control part**
- Manual control via overhead crane type pendant control station
- Control cabinet to be wired, powered from the safety cabinet via multi-pin industrial sockets
- Operator control panel pre-wired on a terminal block
- DOL starting panel, which should be replaced with the one built by the students

**Variant**
- Hoisting crane with an automated control panel consisting of a PLC, drive and display. Load sensors and encoder on the frame

### Main industries
- Electrical engineering
- Electrotechnical engineering

### Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>400 V</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimensions (H x W x D)</strong></td>
<td>Operative part 2150 x 3750 x 1000 mm 370 kg</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>Control part 1000 x 800 x 300 mm 80 kg</td>
</tr>
</tbody>
</table>

### To order

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AA400SLT01DM</td>
<td>Hoisting crane with DOL starting control panel, and commissioning</td>
</tr>
<tr>
<td>MD1AA400SLT01CM</td>
<td>Hoisting crane with panel automated control and commissioning</td>
</tr>
</tbody>
</table>

**Benefits**
- Study of sway
- Wiring activities
- Safe equipment
Industry & machines

Automation & industrial communication
## Automation & industrial communication

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automation software packs reserved for teaching</td>
<td>136</td>
</tr>
<tr>
<td>PLC introductory packs</td>
<td>137</td>
</tr>
<tr>
<td>Machine PLC packs</td>
<td>138</td>
</tr>
<tr>
<td>Industrial PLC packs</td>
<td>141</td>
</tr>
<tr>
<td>Introduction to programmed logic</td>
<td>142</td>
</tr>
<tr>
<td>Panel-mounted training PLCs</td>
<td>143</td>
</tr>
<tr>
<td>PLC and display on control desk</td>
<td>144</td>
</tr>
<tr>
<td>Automation modular offer</td>
<td>145</td>
</tr>
<tr>
<td>Automation operative part modular offer</td>
<td>146</td>
</tr>
<tr>
<td>HMI packs</td>
<td>147</td>
</tr>
<tr>
<td>HMI mobile cabinet</td>
<td>148</td>
</tr>
<tr>
<td>RFID pack</td>
<td>149</td>
</tr>
<tr>
<td>RFID card game modular offer</td>
<td>150</td>
</tr>
<tr>
<td>RFID case</td>
<td>151</td>
</tr>
<tr>
<td>Industrial communication modular offer</td>
<td>152</td>
</tr>
<tr>
<td>Industrial communication on pre-wired grid</td>
<td>153</td>
</tr>
<tr>
<td>Communication case</td>
<td>154</td>
</tr>
<tr>
<td>Communication case for teaching</td>
<td>155</td>
</tr>
</tbody>
</table>
Automation and industrial communication

Automation software packs reserved for teaching

Learning objectives
- To find technical documentation
- To find resolutions and application solutions

Main industries
- Electrical engineering
- Electrotechnical engineering
- Automation engineering

Characteristics

<table>
<thead>
<tr>
<th>Dimension (H x W x D)</th>
<th>20 x 160 x 140 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>0.1 kg</td>
</tr>
<tr>
<td>Recommended configura-</td>
<td>Windows XP, Vista,</td>
</tr>
<tr>
<td>tion</td>
<td>Windows 7</td>
</tr>
</tbody>
</table>

Presentation

These software packs allow teaching and training institutions to obtain Schneider Electric automation software at preferential rates. Purchasing a pack corresponds to a one-year subscription to the software and to the Schneider Electric website software services. Before the subscription expires, we will send an email inviting institutions to resubscribe to software updates and to the site. If your subscription expires, simply purchase the update to receive a DVD containing all the software.

Description

XL functions pack
- UNITY PRO XL (DVD)
- UNITY DIF application comparator (download)
- Advantys STB I/O configurator (DVD)
- PL7 PRO V4.5 (DVD)
- SoMachine
- SoMachine Basic (download)
- SoMove
- TwidoSuite (download)
- Zelio Soft (download)
- Network drivers (Ethernet, Modbus, etc.)
- Access to the Schneider Electric XSL online service website resources (technical files, utilities, documentation, support, forum)
- Academic site license with one-year subscription
- Vijeo Designer pack

Update
Purchasing an update includes a one-year subscription (software and site)

Vijeo Designer software pack
- With 5.7” HMI display
- PC programming cable/display

To access the Schneider Electric XSL site
http://xsl.schneider-electric.com/accueilInit.do

Benefits
- Academic site software licenses
- One-off installation code for the XL pack
- Access to the Schneider Electric XSL site resources

To order

<table>
<thead>
<tr>
<th>MD1ABCDENS</th>
<th>XL functions software pack + VJD pack</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1ABRCDENS</td>
<td>XL functions pack update + VJD pack</td>
</tr>
<tr>
<td>VJDEDUSTU855</td>
<td>Vijeo Designer software pack</td>
</tr>
</tbody>
</table>
Automation and industrial communication

PLC introductory packs

Learning objectives
- To study and set up various types of PLC
- To program a PLC
- To set up industrial communication

Main industries
- Electrical engineering
- Electrotechnical engineering
- Automation engineering

Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>Power supply</th>
<th>Dimensions (H x W x D)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twido PLC</td>
<td>230 V</td>
<td>110 x 230 x 345 mm</td>
<td>1.3 kg</td>
</tr>
<tr>
<td>M221 PLC</td>
<td>200 x 300 x 500 mm</td>
<td>5 kg</td>
<td></td>
</tr>
<tr>
<td>M221 pack with display</td>
<td>300 x 400 x 500 mm</td>
<td>6 kg</td>
<td></td>
</tr>
</tbody>
</table>

Presentation
This offer covers the Twido and M221 programmable controllers, as well as industrial buses and networks (Modbus, CANopen, ASI, Ethernet). Depending on the chosen modules, the user will be able to find out about the different programming types, and the various communication and control functions.

Description

**Twido pack**
- 1 Twido Compact PLC with 24 inputs/16 outputs (discrete) + Ethernet port
- 1 PC to PLC converter (USB/mini DIN)
- 1 data backup battery
- 1 TwidoSuite program

**M221 pack**
- 1 M221 PLC with 24 inputs/16 outputs (discrete), 2 analog inputs + Ethernet port
- 1 Ethernet cable
- 1 PC/PLC USB cable
- 1 simulation terminal block
- 1 SoMachine Basic program + tutorial on USB stick

**M221 pack with display, machine safety module and motor starter**
- 1 M221 PLC with 24 inputs/16 outputs (discrete) and Ethernet port
- 1 module with 4 inputs/2 outputs (analog)
- 1 Ethernet cable
- 1 motor starter module + 9 A contactor and motor circuit breaker
- 1 safety module + 1 emergency stop PB
- 1 x 3.5” Ethernet colour touch screen display
- 1 x 24 VDC/3 A power supply
- 1 input simulation terminal block

**Add-on pack**
- 1 module with 4 inputs/2 outputs (analog)
- 1 motor starter module, 9 A contactor and motor circuit breaker
- 1 machine safety module with emergency stop PB
- 1 x 3.5” Ethernet colour touch screen display
- 1 Wi-Fi switch

To order

<table>
<thead>
<tr>
<th>MD1APTW</th>
<th>Twido pack</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AP21</td>
<td>M221 PLC pack</td>
</tr>
<tr>
<td>MD1AP21C</td>
<td>M221 pack with display, safety module and motor starter</td>
</tr>
<tr>
<td>MD1AP21P</td>
<td>M221/M241 add-on pack</td>
</tr>
</tbody>
</table>

Benefits
- Low-cost solution
- Predefined bundle
- Guided introduction

Twido PLC

M221 PLC
Automation and industrial communication

Machine PLC packs

Learning objectives
- To study and set up various types of PLC
- To program a PLC
- To set up industrial communication

Main industries
- Electrical engineering
- Electrotechnical engineering
- Automation engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td></td>
</tr>
<tr>
<td>M241 pack</td>
<td>100 x 200 x 300 mm</td>
</tr>
<tr>
<td></td>
<td>2 kg</td>
</tr>
<tr>
<td>M241 pack with display</td>
<td>300 x 400 x 500 mm</td>
</tr>
<tr>
<td></td>
<td>6 kg</td>
</tr>
<tr>
<td>M258 pack with display</td>
<td>300 x 300 x 400 mm</td>
</tr>
<tr>
<td></td>
<td>11 kg</td>
</tr>
</tbody>
</table>

Presentation
This offer (over 3 pages) covers the M241, M238, M258 and LMC programmable controllers, as well as industrial buses and networks (Modbus, CANopen, ASI, Ethernet).
Depending on the chosen modules, the user will be able to find out about the different programming types, and the various communication and control functions.
In addition to the automation and drive packs, communication kits using different protocols are offered on page 152.

Description

M241 controller pack with analog I/O
- 1 M241 PLC with 14 inputs/10 outputs (discrete), Ethernet port, CANopen port
- 1 module with 4 inputs/2 outputs (analog)
- 1 programming cable
- 1 Ethernet cable
- 1 SoMachine Basic program

M241 controller pack with display and drive
- 1 M241 PLC with 14 inputs/10 outputs (discrete), Ethernet port, CANopen port
- 1 x 5.7” colour touch screen terminal
- 1 x 24 VDC 3 A power supply
- 1 x 0.18 kW 230 V drive
- 1 CANopen tap junction + CANopen cable
- 1 programming cable
- 1 display/PLC cable
- 1 drive/PLC cable
- 1 SoMachine Basic program

M258 performance controller pack with display and drive
- 1 M258 PLC with 26 inputs/16 outputs, master CANopen port, Ethernet port
- 1 x 5.7” colour touch screen terminal
- 1 x 24 VDC 3 A power supply
- 1 x 0.18 kW 230 V drive
- 1 CANopen tap junction + CANopen cable
- 1 programming cable
- 1 display/PLC cable
- 1 drive/PLC cable

To order

- MD1AP41A: M241 controller pack with analog I/O
- MD1AP241STU: M241 controller pack with display and drive
- MD1AP258STU: M258 controller pack with display and drive

Benefits
- Predefined bundle
- Low-cost solution
Automation and industrial communication

Machine PLC packs (continued)

Learning objectives
* To study and set up various types of PLC
* To program a PLC
* To set up industrial communication

Main industries
* Electrotechnical engineering
* Automation engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Dimensions (H x W x D)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>LMC058 pack</td>
<td>300 x 400 x 600 mm</td>
<td>8 kg</td>
</tr>
<tr>
<td>HMI pack</td>
<td>300 x 400 x 600 mm</td>
<td>10 kg</td>
</tr>
<tr>
<td>RFID pack</td>
<td>300 x 300 x 400 mm</td>
<td>2.5 kg</td>
</tr>
</tbody>
</table>

Description

This offer (over 3 pages) covers the M241, M238, M258 and LMC programmable controllers, as well as industrial buses and networks (Modbus, CANopen, ASI, Ethernet).

Depending on the chosen modules, the user will be able to find out about the different programming types, and the various communication and control functions.

In addition to the automation and drive packs, communication kits using different protocols are offered on page 152.

Learning objectives

* To study and set up various types of PLC
* To program a PLC
* To set up industrial communication

Main industries

* Electrotechnical engineering
* Automation engineering

Characteristics

- **Power supply:** 230 V
- **Dimensions (H x W x D):**
  - LMC058 pack: 300 x 400 x 600 mm, 8 kg
  - HMI pack: 300 x 400 x 600 mm, 10 kg
  - RFID pack: 300 x 300 x 400 mm, 2.5 kg

Presentation

To order

<table>
<thead>
<tr>
<th>MD1AP058LX</th>
<th>LMC058 motion controller pack with LEXIUM 32</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1APHMISCU</td>
<td>Controller HMI pack with drive</td>
</tr>
<tr>
<td>MD1APPFRFID</td>
<td>RFID tracking pack</td>
</tr>
<tr>
<td>MD1APPFCV</td>
<td>Vision pack for quality control</td>
</tr>
</tbody>
</table>

Benefits

* Predefined bundle
* Low-cost solution
Automation and industrial communication

Machine PLC packs (continued)

Learning objectives
- To study and set up various types of PLC
- To program a PLC
- To set up industrial communication

Main industries
- Electrotechnical engineering
- Automation engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Modbus pack</th>
<th>CANopen pack</th>
<th>Ethernet pack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>300 x 300 x 400 mm</td>
<td>300 x 300 x 400 mm</td>
<td>300 x 300 x 400 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>1.5 kg</td>
<td>1.5 kg</td>
<td>1.5 kg</td>
</tr>
</tbody>
</table>

Description

Modbus connections
- 1 module with 12 inputs/8 outputs (remote) on Modbus
- 1 Modbus splitter box with 8 channels
- 4 x 1 m Modbus cables
- 1 TeSys U motor starter on Modbus
- 1 x 24 VDC 1.2 A power supply
- 1 energy meter on Modbus
- 1 ADVANTYS configuration program

CANopen connections
- 1 module with 12 inputs/8 outputs (remote) on CANopen
- 1 CANopen splitter box with 4 channels
- 5 x 1 m CANopen cables
- 1 SubD/RJ45 CANopen cable
- 1 x 24 VDC 1.2 A power supply
- 1 x 0.18 kW 230 V drive
- 1 programming cable
- 1 ADVANTYS configuration program

Ethernet connections
- 1 module with 12 inputs/8 outputs (remote) on Ethernet
- 1 switch with 5 ports
- 4 RJ45/RJ45 cables
- 1 x 24 VDC 1.2 A power supply
- 1 x 0.75 kW drive with Ethernet card
- 1 programming cable
- 1 Modbus/Ethernet gateway
- 1 ADVANTYS configuration program

Presentation

This offer (over 3 pages) covers the M241, M238, M258 and LMC programmable controllers, as well as industrial buses and networks (Modbus, CANopen, ASI, Ethernet). Depending on the chosen modules, the user will be able to find out about the different programming types, and the various communication and control functions.

In addition to the automation and drive packs, this page offers you communication kits using different protocols.

To order

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1APCM</td>
<td>Modbus communication add-on</td>
</tr>
<tr>
<td>MD1APCC</td>
<td>CANopen communication add-on</td>
</tr>
<tr>
<td>MD1APCE</td>
<td>Ethernet communication add-on</td>
</tr>
</tbody>
</table>

Remote OTB I/O on bus
Automation and industrial communication

Industrial PLC packs

Learning objectives
- To study and set up various types of PLC
- To program a PLC
- To set up industrial communication

Main industries
- Electrotechnical engineering
- Automation engineering

Presentation
This offer covers the M340 programmable controller as well as industrial buses and networks (Modbus, CANopen, ASI and Ethernet). Depending on the chosen modules, the user will be able to find out about the different programming types, and the various communication and control functions.

Description
The first pack below corresponds to the basic offer. The next packs offer specific extra components.

| Power supply | 230 V |
| Dimensions (H x W x D) | M340 Modbus pack 300 x 300 x 300 mm 6 kg |
| Weight | M340 Modbus pack 6 kg |
| | M340 Modbus Eth pack 300 x 300 x 300 mm 6 kg |

Basic M340 Modbus pack
- 1 M340 Modbus processor + USB
- 1 x 230 V power supply
- 1 x 16-input module with screw terminals
- 1 x 16-relay output module with screw terminals
- 1 expandable rack with 4 slots
- 1 PC to PLC USB cable

M340 Modbus pack
- 2 (instead of 1) 16-input modules with screw terminals
- 1 expandable rack with 8 slots (instead of 4)

M340 Modbus Ethernet pack
- 1 M340 Modbus CPU + USB + Ethernet FTP + 1 x 8 MB memory card
- 1 expandable rack with 8 slots (instead of 4)

M340 Modbus Ethernet CANopen pack (3 networks + web)
- 1 M340 Modbus and CANopen CPU + USB + 1 Ethernet FTP module and web, 1 x 8 MB memory card
- 1 expandable rack with 8 slots (instead of 4)

Add-ons
- Process control add-on:
  - 1 module with 4 isolated analog inputs + terminals
  - 1 module with 2 isolated outputs + terminals
- AS-i add-on:
  - 1 AS-i module
  - 1 addressing pocket terminal
  - 1 module with 4 inputs/4 outputs + connection accessory
  - 1 control station with pilot lights + connection accessory
  - 1 AS-i bus power supply
  - 1 AS-i cable, 20 m long

To order
- MD1AP34MN Basic M340 Modbus pack
- MD1AP34M M340 Modbus pack
- MD1AP34ME M340 Modbus Ethernet pack
- MD1AP34MEC M340 Ethernet CANopen pack
- MD1AP34R Process control add-on for M340 pack
- MD1AP34ASI AS-i add-on for M340 pack
Introduction to programmed logic
ZELIO case

Learning objectives
- To understand programmed logic
- To program an automation system

Main industries
- Electrical engineering
- Civil engineering
- Industrial maintenance
- Automation engineering

Description
This case is designed to introduce students to programmed logic. It provides a complete gradual teaching method for students to learn how the Zelio module performs, using various programming languages (Ladder, FBD).

Characteristics
| Power supply  | 230 V/30 VA |
| Dimensions (H x W x D) | 130 x 350 x 380 mm |
| Weight | 3.5 kg |

To order
MD1ZELIO  Zelio case
MD1ZELIOB  Zelio Bluetooth case
**Panel-mounted training PLCs**

**Learning objectives**
- Zelio: To program in Ladder (LD) or Function Block Diagram (FBD) language with Zelio Soft 2 software
- Twido: To program in Instruction List (IL) or Ladder (LD) language with TwidoSuite software
- TSX37 Micro and TSX57 Premium: To program in Grafcet (SFC), Ladder (LD), Structured Text (ST), Instruction List (IL) language with PL7 Micro or PL7 Pro software
- TSX57 Premium and M340: To program in LD, FBD, SFC, ST and IL language with Unity Pro software

**Presentation**
These panels are designed for studying PLC programming and creating programs in specific languages. They can be used for debugging automation systems of increasing complexity, working with various functions (time delay, comparator, register, calculations, process control, communication, etc.). For the M340 and Premium panels, the I/O cards or smart modules can be adapted on request.

Programming software is only provided for Zelio and Twido modules.

**Main industries**
- Automation engineering

**Characteristics**

| Power supply | 230 V/30-100 VA |
| Dimensions (H x W x D) | Zelio 130 x 290 x 300 mm 2 kg |
| Weight | Twido 150 x 290 x 300 mm 3 kg |
| | TSX37 Micro 250 x 400 x 410 mm 5 kg |

**Zelio panel**
- Zelio module with 12 inputs/8 outputs (discrete) (without simulator)
- Zelio Soft programming software

**Twido panel**
- Twido compact PLC with 14 inputs/10 outputs (discrete)
- TwidoSuite programming software

**TSX37 Micro panel**
- TSX3722 Micro PLC with 16 inputs/16 outputs (discrete) + 3 inputs/1 output (analog)

**TSX57 Premium panel**
- 1 Ethernet Premium CPU (PL7 or Unity) with 16 inputs/16 outputs (discrete) + 4 inputs/4 outputs (analog)
- 1 rack with 8 slots

**M340 panel**
- 1 M340 Ethernet/Modbus CPU with 16 inputs/16 outputs (discrete) + 4 inputs/2 outputs (analog)
- 1 rack with 8 slots

**Benefits**
- Ready-to-use PLCs
- Safe, rugged wiring

---

**To order**

| MD1AE125 | Zelio panel |
| MD1AE120 | Twido panel |
| MD1AE110 | TSX37 Micro panel |
| MD1AE130 | TSX57 Premium panel |
| MD1AE130UTY | TSX57 Premium panel in Unity |
| MD1AE150 | M340 panel |
**Automation and industrial communication**

**PLC and display unit on control desk**

**TSXBT control desk**

---

### Learning objectives
- To program a PLC with Unity Pro
- To study the display unit
- To program the HMI terminal with Vijeo Designer
- To operate the terminal
- To manage breakdowns via feedback from the terminal

### Presentation
The TSXBT control desk consists of an M340 PLC whose discrete I/O are remotely located in the form of switches and sockets. A switch is used to select either the control desk inputs or the inputs of an external operative part. The analog I/O are remotely located in the form of female connectors. The male connectors are pre-wired. A MAGELIS terminal acts as a human-machine interface which can be used in run mode or programming mode by means of a selector switch.

### Main industries
- Electrical engineering
- Automation engineering
- Electrotechnical engineering

### Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>230 V/120 VA</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>620 x 625 x 380 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>21 kg</td>
</tr>
</tbody>
</table>

### Benefits
- Can be used on its own or as a PC to control an operational part
- Safe system

### To order

MD1AE170 | M340 control desk + STU HMI

---

*Image of the TSXBT control desk*
Automation and industrial communication

Automation modular offer

Learning objectives
- To study and set up various types of PLC (Twido, M340):
  - programming
  - communication with variable speed drives, networked motor starters, etc.
  - process control functions
- To learn about industrial communication networks and buses (Modbus, CANopen, ASi, Ethernet)
- To study human-machine interface terminals

Presentation
This offer can be used to build automation system architectures, using the most commonly used components and communication networks. It can be used to learn about Twido and M340 PLCs, communication between PLCs and industrial devices, and also human-machine interface terminals.

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/150 VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>942 x 950 x 400 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>6.5 kg</td>
</tr>
<tr>
<td>Single module</td>
<td>245 x 150 x 70 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>0.7 kg</td>
</tr>
<tr>
<td>Double module</td>
<td>245 x 300 x 70 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>1.4 kg</td>
</tr>
</tbody>
</table>

Main industries
- Automation engineering
- Industrial maintenance

Composition
Two basic offers are available, with Twido or M340 PLCs. They include the modules below. You can also order each module separately according to requirements.

### Twido entry-level modular offer
| MD1AMLTW
| Support frame | 1 MD1AM000 |
| Twido module with 24 inputs and 16 outputs | 1 MD1AM0002 |
| Module with 16 discrete inputs with ribbon cables | 1 MD1AM0005 |
| Module with 16 discrete outputs with ribbon cables | 1 MD1AM0006 |
| 24 VDC/2.5 A power supply module with cable | 1 MD1AM4001 |
| Display module | 1 MD1AM0008 |
| Machine control module | 1 MD1AM7002 |

### M340 entry-level modular offer
| MD1AMLMR
| Support frame | 1 MD1AM000 |
| M340 module with 1 card with 16 inputs and 16 outputs | 1 MD1AM0003 |
| Module with 16 discrete inputs with ribbon cables | 1 MD1AM0005 |
| Module with 16 discrete outputs with ribbon cables | 1 MD1AM0006 |
| 24 VDC/2.5 A power supply module with cable | 1 MD1AM4001 |
| Display module | 1 MD1AM0008 |
| Machine control module | 1 MD1AM7002 |

Benefits
- Quick, safe setup
- Rugged wiring on safety sockets

To order
- MD1AMLTW Twido entry-level modular offer
- MD1AMLMR M340 entry-level modular offer
Automation and industrial communication

Automation operative part modular offer

Learning objectives
- To apply commands from a PLC to a single operative part
- To control discrete elements or variations on a reversing or non-reversing motor
- To control temperature
- To control barrier or traffic light control systems
- To control a press sequence

Main industries
- Automation engineering
- Industrial maintenance

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Dimensions (H x W x D)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor</td>
<td>230 V/400 V - 0.18 kW</td>
<td>7 kg</td>
</tr>
<tr>
<td></td>
<td>250 x 390 x 205 mm</td>
<td></td>
</tr>
<tr>
<td>Conveyor belt</td>
<td>230 V/400 V - 0.18 kW</td>
<td>10 kg</td>
</tr>
<tr>
<td></td>
<td>330 x 1050 x 350 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>330 x 2050 x 350 mm</td>
<td>15 kg</td>
</tr>
<tr>
<td>Modules</td>
<td>24 VDC/48 VDC</td>
<td>0.7 kg</td>
</tr>
<tr>
<td></td>
<td>250 x 110 x 70 mm</td>
<td></td>
</tr>
</tbody>
</table>

Presentation
The operative parts (OP) included in this offer are designed for totally safe connection to modules in the motor starter and automation modular offers (see pages 111 and 145). They are used to display correct operation of an automation sequence created in a modular offer. The operative parts in the modular offer can also be used with other PCs.

Description
- Plinth-mounted 180 W 230/400 V asynchronous motor
- Plinth-mounted 180 W 400/690 V asynchronous motor
- 180 W 230/400 V motorized fan unit with vent stack (see page 88)
- 1 m or 2 m tabletop conveyor equipped with:
  - 2 photoelectric sensors
  - 180 W 230/400 V asynchronous motor
- Traffic management module representing traffic lights at a crossroads
- Automatic barrier, taking safety features into account
- Temperature controller, for studying process control:
  - oven heated by incandescent lamp (0-10 V)
  - PT100 probe
  - measurement transmitter
- Process control module: simulates a punching system

To order

| MD1AMP001 | 180 W 230/400 V motor |
| MD1AMP013 | 180 W 400/690 V motor |
| MD1AMP014 | 180 W 230/400 V motorized fan with stack and ball |
| MD1AMP002 | 1 m conveyor         |
| MD1AMP024 | 2 m conveyor         |
| MD1AMP003 | Traffic management   |
| MD1AMP005 | Automatic barrier    |
| MD1AMP006 | Temperature controller|
| MD1AMP008 | Process control      |

Benefits
- Quick, safe setup
- Rugged wiring on safety sockets
- Compact operative parts
Automation and industrial communication

HMI packs

Learning objectives
- To understand and use HMI functions
- To tackle supervision functions
- To study and set up various types of touchscreen terminal
- To learn about Vijeo Designer software

Main industries
- Automation engineering
- Industrial maintenance

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/6 to 20 W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td></td>
</tr>
<tr>
<td>HM655 pack</td>
<td>300 x 300 x 400 mm, 7 kg</td>
</tr>
<tr>
<td>HM655 pack</td>
<td>300 x 300 x 400 mm, 7 kg</td>
</tr>
<tr>
<td>HM307 pack</td>
<td>300 x 300 x 300 mm, 7 kg</td>
</tr>
</tbody>
</table>

Weight

- 7 kg

Description

This offer discusses the various types of touchscreen graphic display terminals in the MAGELIS range (HMISTU, XBTGTO, HMSCCU) and the Vijeo Designer programming software. Depending on the chosen modules, the user will be able to find out about the different programming options, and the various communication functions.

To order

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1APHMI655</td>
<td>Ethernet colour 3.5” HMI pack</td>
</tr>
<tr>
<td>MD1APHMI855</td>
<td>Ethernet colour 5.7” HMI pack</td>
</tr>
<tr>
<td>MD1APHMI07V2</td>
<td>Web server colour 7.5” XBT pack</td>
</tr>
<tr>
<td>MD1APHMI10V2</td>
<td>Web server colour 10.4” XBT pack</td>
</tr>
<tr>
<td>MDTAPHMISCU</td>
<td>Magelis HMI SCU HMI controller pack</td>
</tr>
</tbody>
</table>
Automation and industrial communication

**Touchscreen HMI mobile cabinet**

### Learning objectives
- To understand and master the fundamental principles of communication
- To set up exchanges between an HMI and a communicating system
- To learn the basics of supervision

### Presentation
This cabinet can be used to view the data in a teaching system without affecting its integrity. Screens can easily be developed using the Vijeo Designer configuration software (not supplied). The interface with the teaching system is via an RJ45 connection.

### Description
- 5.7” colour touchscreen display
- 24 VDC power supply for the display
- Industrial Ethernet switch with 4 ports
- USB, Ethernet and RS485 connections

### Main industries
- Electrical engineering
- Industrial maintenance
- Electrotechnical engineering
- Automation engineering
- Industrial maintenance

### Characteristics

| Power supply | 230 V/20 W |
| Dimensions (H x W x D) | 291 x 341 x 128 mm |
| Weight | 3 kg |

### Benefits
- Creation of screens for a teaching project
- Vijeo Designer tutorials available on the Internet
- External display of system data

### To order
MD1AEHM185 | Touchscreen HMI mobile cabinet
Learning objectives

- To understand RFID data transmission technology
- To set up products and configure the station numbers
- To set up Modbus/TCP communication between the stations and the PLC

Presentation

The RFID pack can be used to study and set up an access control, identification and tracking application. Each station has an address in the network with read/write access. Addressing is very easy to do, using a special badge provided. Data is stored in the badge or in the label illustrated.

Description

This RFID pack comprises:

- 1 Twido PLC with 40 I/O, Ethernet port
- 1 Ethernet concentrator box for 3 read stations
- 2 read/write stations
- 2 x 2 m extension cables for the stations
- 1 x 24 VDC power supply, 1.2 A with cable for the concentrator box
- 1 Ethernet switch with 5 ports
- 1 x 2 m Ethernet cable for the concentrator box/switch
- 2 switch/PC and switch/PLC Ethernet cables
- 1 set of 10 RFID badges
- 2 station configuration badges
- 1 set of 5 RFID round labels
- 1 PLC programming cable
- 1 TwidoSuite software

Main industries

- Electronic engineering
- Electrotechnical engineering
- Automation engineering
- Industrial maintenance

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/60 VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>400 x 600 x 600 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>6 kg</td>
</tr>
</tbody>
</table>

Benefits

- Low-cost solution
- Complete predefined package
- Creation of a mini-project

To order

MD1PACKRFID | RFID pack
RFID card game modular offer

**Learning objectives**
- To understand RFID data transmission technology
- To learn about the communication mechanisms between Modbus/TCP IT equipment:
  - addressing a read/write station
  - calculating a data item, 16-bit encoding
  - writing data encoded in a badge
  - reading an encoded badge
  - analysis of a 16-bit response
- To display Modbus frames
- To use interactive card games
- Programming in Windows and JavaScript on Magelis

**Main industries**
- Electronic engineering
- Sustainable development and environment engineering
- Electrotechnical engineering
- Electronic engineering

**Characteristics**

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/10 W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>1030 x 910 x 400 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>6.5 kg</td>
</tr>
<tr>
<td>Support frame</td>
<td>244 x 150 x 70 mm</td>
</tr>
<tr>
<td>Single module</td>
<td>0.7 kg</td>
</tr>
<tr>
<td>Double module</td>
<td>244 x 300 x 70 mm</td>
</tr>
<tr>
<td></td>
<td>1.4 kg</td>
</tr>
</tbody>
</table>

**Benefits**
- Frame reading app on a tablet
- Quick, safe setup
- Fun aspect to the equipment

**To order**
- MD1AMLRFID | RFID card game modular offer

**Presentation**
This offer is used to learn about RFID transmission technology, based on an interactive card game. It can also be used to introduce students to communication between Modbus/TCP IT equipment. A computer can be connected either with a wired connection, or wirelessly, to display the frames and data transmitted on the bus.

**Composition**
The basic offer consists of the elements below. The games and teaching applications are supplied on CD, as well as an Android app for tablets. You can also order each module separately according to requirements.

<table>
<thead>
<tr>
<th>RFID card game modular offer</th>
<th>MD1AMLRFID</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFID module</td>
<td>1 MD1AMP016</td>
</tr>
<tr>
<td>24 VDC power supply module</td>
<td>1 MD1AM4001</td>
</tr>
<tr>
<td>Wi-Fi router module</td>
<td>1 MD1AM2010</td>
</tr>
</tbody>
</table>
Automation and industrial communication

RFID case

Learning objectives
- To understand RFID data transmission technology
- To configure the station numbers
- To set up Modbus/TCP communication between the stations and the PLC

Main industries
- Electronic engineering
- Electrotechnical engineering
- Automation engineering
- Industrial maintenance
- Electronic engineering

Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>Power supply</th>
<th>230 V/60 VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>260 x 555 x 465 mm</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>8 kg</td>
<td></td>
</tr>
</tbody>
</table>

Presentation
The RFID case can be used to study and set up an access control, identification and tracking application. It comprises a programmable logic controller connected to two compact read/write stations, via an Ethernet box. Each station has an address in the network with read/write access. Addressing is very easy to do, using a special badge provided. Data is stored in the badge or in the label illustrated.

Description
The case comprises:
- 1 Twido PLC with 40 I/O, Ethernet port
- 1 HMI terminal
- 1 Ethernet concentrator box for 3 read stations
- 2 read/write stations
- 1 x 24 VDC power supply
- 2 circuit breakers
- 1 Ethernet switch with 5 ports
- 1 set of 10 RFID badges
- 2 station configuration badges
- 1 set of 5 RFID round labels
- 1 PLC programming cable
- 1 TwidoSuite program

Benefits
- Case is quick to set up
- Ethernet/Modbus/RFID communication setup
- RFID communication diagnostics

To order
MD1AAVRFID | RFID case
Industrial communication modular offer

Learning objectives
- To configure an industrial fieldbus network
- To program an exchange using Unity Pro
- To diagnose a communication fault
- To define a communication architecture
- To choose a communication medium

Presentation
Industrial automation solutions rely increasingly on communication networks and fieldbuses. This modular offer can be used to quickly create a communication configuration with the most common protocols: Ethernet TCP/IP, CANopen, MODBUS serial, etc. Inter-PLC exchanges are possible by adding the modules illustrated in our “Modular Offer” catalogue to your configuration.

Main industries
- Electrotechnical engineering
- Electronic engineering
- Industrial maintenance
- Automation engineering
- Electrical engineering

Characteristics

| Power supply | 230 V |
| Dimensions (H x W x D) | Frame 1030 x 910 x 400 mm 6.5 kg |
| | Modules 244 x 150 x 70 mm 0.7 kg |
| Weight |

Composition
The MD1AMLCOM global offer consists of the modules below. You can also order each module separately according to requirements.

<table>
<thead>
<tr>
<th>Industrial communication modular offer</th>
<th>MD1AMLCOM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support frame</td>
<td>1 MD1AM000</td>
</tr>
<tr>
<td>24 VDC 2.5 A power supply module</td>
<td>1 MD1AM4001</td>
</tr>
<tr>
<td>Multi-communication M340 PLC module</td>
<td>1 MD1AM0024</td>
</tr>
<tr>
<td>5.7” touchscreen graphic terminal module</td>
<td>1 MD1AM0016</td>
</tr>
<tr>
<td>Ethernet switch module</td>
<td>1 MD1AM0025</td>
</tr>
<tr>
<td>Ethernet router module</td>
<td>1 MD1AM0026</td>
</tr>
<tr>
<td>Modbus hub module</td>
<td>1 MD1AM0011</td>
</tr>
<tr>
<td>Ethernet/Modbus gateway module</td>
<td>1 MD1AM0022</td>
</tr>
<tr>
<td>Power meter module connected via Modbus</td>
<td>1 MD1AM2003</td>
</tr>
<tr>
<td>Module with 3 current sensors, 50/5 A</td>
<td>1 MD1AM2004</td>
</tr>
<tr>
<td>Ethernet remote I/O module</td>
<td>1 MD1AM0023</td>
</tr>
<tr>
<td>CANopen remote I/O module</td>
<td>1 MD1AM0028</td>
</tr>
<tr>
<td>Modbus RFID sensor module</td>
<td>1 MD1AM0021</td>
</tr>
<tr>
<td>Modbus CANopen variable speed drive module</td>
<td>1 MD1AM5001</td>
</tr>
<tr>
<td>Thermal-magnetic protection module</td>
<td>1 MD1AM1004</td>
</tr>
</tbody>
</table>

Benefits
- Quick, safe setup
- Rugged wiring on safety sockets
- Scalable solution

To order
MD1AMLCOM | Industrial communication modular offer
Learning objectives
- To connect a bus or network
- To configure an industrial fieldbus network
- To diagnose a communication fault
- To program an exchange using Unity Pro
- To define a communication architecture
- To choose a communication medium

Presentation
Automation solutions rely increasingly on communication networks and fieldbuses. These configurations can be used to learn about the most common protocols: Ethernet, CANopen, Modbus, etc.
The pre-wired grid solution can be used to replicate an industrial control system installation with the different types of communication between sensors, PLCs and actuators.

Main industries
- Electrotechnical engineering
- Automation engineering
- Automation engineering
- Electrical engineering

Characteristics

| Power supply | 230 V |
| Dimensions (H x W x D) | Modbus+Ethernet version 800 x 600 x 250 10 kg |
| Weight | Ethernet version 800 x 600 x 250 10 kg |

Description
Two pre-wired grid versions are available:

**Modbus + CANopen version**
- 1 Modbus CANopen M340 PLC
- 1 Modbus hub
- 1 set of CANopen connections
- 1 colour touchscreen display
- 1 Modbus power meter
- 1 CANopen remote I/O module
- 1 Modbus CANopen communicating drive

**Ethernet version**
- 1 M340 Ethernet PLC
- 1 I/O simulator
- 1 M221 PLC
- 1 switch
- 1 colour touchscreen display
- 1 Ethernet remote I/O module
- 1 Ethernet communicating drive
- 1 Ethernet RFID sensor

Benefits
- Ready-to-use solution
- Scalable solution

To order
- MD1AE34MC Modbus CANopen communication grid
- MD1AE34E Ethernet communication grid
**Automation and industrial communication**

**Communication case**

---

### Learning objectives
- To communicate on RS232 point-to-point LAN: ASCII character, format, bitrate, control, PC and PLC configuration
- To study the concepts of master/slave, addressing, polling
- To study the concepts of protocol, transparency and system requests
- To communicate in conversational mode between PC and PLC
- To study web technology on an Ethernet LAN:
  - PC and web browser configuration
  - site update
  - creation of HTML pages
  - OFS, OPC Factory Server: object concept which allows IT applications (VB, C++) to access the PLC memory
- To set up remote access to a PLC via a LAN:
  - Xway, IP addressing
  - using the XIP driver on Ethernet
- To set up an exchange between PLCs via an Ethernet LAN:
  - IP addressing, subnet mask
  - SNTP server
- To set up remote management and remote programming:
  - with HTML pages
  - with PL7 Pro software and XIP driver

### Main industries
- Electrotechnical engineering
- Automation engineering
- Electronic engineering
- Industrial maintenance
- Electrical engineering
- Mechanical engineering

### Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>230 V/850 VA</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>560 x 470 x 330 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>20 kg</td>
</tr>
</tbody>
</table>

### Description

The communication case can be used to study and set up different industrial communication networks and buses. It features a multi-protocol Premium PLC, a Twido PLC and a MAGELIS HMI terminal.

- 1 TSX57 Premium PLC, with:
  - 1 Ethernet TCP/IP module
  - 1 ASI module
  - 1 RS232/485 and Modbus serial link module
  - 1 Unitelway channel
- 1 Modbus splitter box
- 1 ASI bus power supply and an ASI bus with ASI control station
- 1 XBT R HMI terminal
- 1 Twido PLC with Ethernet port and I/O on 25-way SubD connectors

---

### To order

MD1AE845TW | Communication case
Automation and industrial communication

**Communication case for teaching**

**Teaching com case**

**Learning objectives**
- To understand and master the fundamental principles of communication
- To set up exchanges between PLCs and display units
- To act as basic equipment for academic training on the communicating LV switchboard

**Presentation**
This case contains LV switchboard communication solutions for teaching purposes. It can be used to experiment and exchange data via Modbus between subsystems, characterized by a Zelio or a Twido to a TSX37 Micro. This information can be viewed on a display unit or supervision system.

**Main industries**
- Electrical engineering
- Electrotechnical engineering

**Characteristics**

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/130 VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>500 x 450 x 270 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>12 kg</td>
</tr>
</tbody>
</table>

**Description**
- 1 TSX37 PLC with Modbus card
- 1 Modbus cable splitter box
- 1 Zelio PLC with 10 I/O with Modbus module
- 1 Twido PLC with 40 I/O with 14-input simulator, and 1 RS 485 port for Modbus
- 1 x 24 VDC power supply
- 1 x 3.5” touchscreen terminal
- 3 projecting communication sockets (USB, Ethernet, RS 485)
- 1 Zelio programming cable
- 1 Twido/TSX37 programming cable
- 1 PLC/terminal cable
- 1 slot provided for the TSXETZ510 Ethernet module (not supplied)

**Benefits**
- Quick, safe setup
- Introduction to industrial communication
- Communication between 3 different types of PLC

**To order**
MD1AE845BP | Communication case for teaching
Industry & machines

Systems & subsystems
## Industry & machines

**Systems & subsystems**

<table>
<thead>
<tr>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D operative parts of industrial machines</td>
<td>158</td>
</tr>
<tr>
<td>Traffic management automation system mock-up</td>
<td>159</td>
</tr>
<tr>
<td>Lift automation system mock-up</td>
<td>160</td>
</tr>
<tr>
<td>Mock-up for introduction to the automation system</td>
<td></td>
</tr>
<tr>
<td>surface treatment</td>
<td>161</td>
</tr>
<tr>
<td>Wiring panel for intermediate certification</td>
<td>162</td>
</tr>
<tr>
<td>1 digital axis training bench</td>
<td>163</td>
</tr>
<tr>
<td>Level control training bench</td>
<td>164</td>
</tr>
<tr>
<td>1 brushless axis training bench</td>
<td>165</td>
</tr>
<tr>
<td>Pneumatic joystick with rotary actuator</td>
<td>166</td>
</tr>
<tr>
<td>5-movement pneumatic joystick</td>
<td>167</td>
</tr>
<tr>
<td>Automatic part sorting subsystem</td>
<td>168</td>
</tr>
<tr>
<td>Automated drilling system</td>
<td>169</td>
</tr>
<tr>
<td>Parcel sorting system</td>
<td>170</td>
</tr>
<tr>
<td>Stage lighting gantry</td>
<td>171</td>
</tr>
<tr>
<td>Industrial packaging machine</td>
<td>172</td>
</tr>
<tr>
<td>Integrated production system</td>
<td>173</td>
</tr>
<tr>
<td>Flexible dosing line</td>
<td>174</td>
</tr>
<tr>
<td>Packaging line</td>
<td>175</td>
</tr>
<tr>
<td>Assembly line</td>
<td>177</td>
</tr>
<tr>
<td>VIRTUAL UNIVERSE PRO 3D simulator</td>
<td>184</td>
</tr>
</tbody>
</table>
3D operative parts of industrial machines

FACTORY I/O

Learning objectives

- To understand how to program a control system (M340 or M221 PLCs)
- To simulate operative parts interactively
- To diagnose malfunctions

Presentation

FACTORY I/O is an educational software tool for teaching users how to program M340 and M221 industrial PLCs.
The virtual environments proposed are realistic because of the total interactivity offered and the quality of real-time 3D graphic animations, dynamics and sounds.
It can be used to build, simulate and repair breakdowns on virtual industrial systems. The systems are connected electrically to the PLCs.
The simulator provides access to an operator panel with an AUTO mode, an emergency stop and 3 pushbuttons (START, STOP, RESET).
This software was developed by the University of Reims Champagne Ardennes and the REAL GAMES company. It is marketed by Schneider Electric with an interface unit.

Main industries

- Industrial maintenance
- Electrotechnical engineering
- Automation engineering
- Automation engineering

Characteristics

<table>
<thead>
<tr>
<th>Recommended configuration</th>
<th>FACTORY I/O compatible from Windows XP onwards</th>
</tr>
</thead>
</table>

Description

Each reference consists of:
- 1 FACTORY I/O software program
- 1 interface unit
- 1 complete PLC with pre-wired terminals or pre-wired terminals only (PLC must already be owned in this case)

FACTORY I/O software

- Software access rights via a code
- Virtual machines configured easily using 60 elementary objects
- 6 preconfigured mock-ups:
  - 3 case sorting systems
  - 1 Pick & Place system
  - 1 automated vertical magazine feed

FACTORY I/O can also be combined with other PLCs.
In this case, use the modular offer reference with safety socket unit.

Benefits

- New version with configurable operative part
- I/O wired connections for maintenance
- Possible to create faults

To order

| MD1S3DM340APF | FACTORY I/O software + M340 |
| MD1S3DM340BF | FACTORY I/O software + terminals for M340 |
| MD1S3DM221APF | FACTORY I/O software + M221 |
| MD1AM0030 | FACTORY I/O software + modular offer unit |
Mock-up for introduction to the traffic management automation system
Traffic management

Learning objectives
● To study and configure operation of signals at a crossroads:
   ○ manage a barrier with vehicle present
   ○ program a normal and flashing operating cycle
   ○ manage a pedestrian call
● To grasp the concepts of the following automation systems:
   ○ switch from wired logic to programmed logic
   ○ study of GRAFCET cycles
   ○ study of upcounters and downcounters
   ○ study of time delays and monostables
   ○ study of run modes (jog, manual, automatic)

Main industry
● Automation engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/80 VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operative part</td>
<td>270 x 350 x 80 mm</td>
</tr>
<tr>
<td>Zelio control part</td>
<td>130 x 290 x 310 mm</td>
</tr>
<tr>
<td>Twido control part</td>
<td>130 x 380 x 350 mm</td>
</tr>
<tr>
<td>TSX3 Micro control part 1</td>
<td>220 x 380 x 350 mm</td>
</tr>
<tr>
<td>TSX3 Micro control part 2</td>
<td>220 x 380 x 350 mm</td>
</tr>
<tr>
<td>M340 control part</td>
<td>220 x 380 x 350 mm</td>
</tr>
</tbody>
</table>

Benefits
● Introduction to the control system

Presentation
The traffic management mock-up can be used for familiarization with the control system on an easily understandable application. The languages used, depending on the type of PLC, are LADDER, GRAFCET or FBD (Function Block Diagram).

Description
Operative part
● Traffic light management
● Pedestrian call
● Priority choices, etc.

Control part
● 1 PLC on a control desk, from the following:
   ○ Zelio
   ○ Twido
   ○ TSX37 Micro
   ○ M340
● I/O on connectors
● 2 ribbon cables

To order

<table>
<thead>
<tr>
<th>MD1AE214</th>
<th>Traffic management operative part</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AE713ZL</td>
<td>Zelio traffic control part</td>
</tr>
<tr>
<td>MD1AE713TW</td>
<td>Twido traffic control part</td>
</tr>
<tr>
<td>MD1AE216</td>
<td>TSX Micro traffic control part</td>
</tr>
<tr>
<td>MD1AE216MR</td>
<td>M340 traffic control part</td>
</tr>
</tbody>
</table>
Mock-up for introduction to the lift automation system

Lift mock-up

Learning objectives
- To study how a lift works:
  - car floor calling
  - car return journey with and without stopping
  - locking operation, up/down collective
- To grasp the concepts of the following control systems:
  - switch from wired logic to programmed logic
  - study of GRAFCET cycles
  - time delay function
  - working on words and bits
  - using an animation table
  - program section organization

Presentation
The lift mock-up can be used for familiarization with the control system on an application including numerous conditions to be managed. The languages used, depending on the type of PLC, are LADDER, GRAFCET or FBD (Function Block Diagram).

Description

Operative part
- Lift with five floors
- Landing door contact
- Floor control in car
- Landing call buttons
- Car arrival sensors

Control part
- 1 PLC on a control desk, from the following:
  - Twido,
  - TSX37 Micro
  - M340
- I/O on connectors
- 2 ribbon cables

Main industries
- Automation engineering

Characteristics

| Power supply | 230 V/50 VA to 130 VA |
| Dimensions (H x W x D) | Operative part 800 x 440 x 440 mm 12 kg |
|               | Twido control part 160 x 290 x 310 mm 3 kg |
|               | TSX37 Micro control part 210 x 290 x 310 mm 4.5 kg |
|               | M340 control part 200 x 290 x 310 mm 3.8 kg |

Benefits
- Control system expertise

To order
- MD1AE254 Lift operative part
- MD1AE256TW Twido lift control part
- MD1AE256 TSX Micro lift control part
- MD1AE256MR M340 lift control part
Mock-up for introduction to the surface treatment system control system TS1

Learning objectives
- To study how surface treatment works:
  - manual control of the cage
  - cage return journey with stopping
  - semi-automatic cage travel
  - cyclic programming
  - cage return journey automatic cycle with passage through the tanks
- To grasp the concepts of the following automation systems:
  - sequential programming
  - managing run and stop modes (GEMMA)
  - study of a linear GRAFCET
  - programming in LADDER
  - using monostable and bistable blocks
  - using time delay blocks
  - using comparison blocks

Main industries
- Automation engineering

Characteristics

| Power supply | 230 V/80 VA to 120 VA |
| Dimensions (H x W x D) | Operative part 400 x 700 x 350 mm 18 kg | Twido control part 170 x 290 x 310 mm 2 kg |
|               | TSX37 Micro control part 210 x 380 x 350 mm 5 kg | M340 control part 230 x 290 x 310 mm 4 kg |
| Weight        | 18 kg |

Description

Operative part
- 1 hanging cage
- 5 sensors along the line of travel
- 2 up/down sensors
- 3 surface treatment tanks
- 3 treatment stations
- 2 loading/unloading stations
- 4 buttons (up/down/left/right)
- 1 selector switch (man/zero/auto)
- 1 Start cycle button
- 1 emergency stop button

Control part
- 1 PLC on control desk with I/O on connectors with ribbon cables:
  - Twido
  - TSX37 Micro
  - M340
- I/O on connectors
- 2 ribbon cables

Presentation
The surface treatment mock-up can be used for familiarization with the control system on a sequential application with run mode management. The languages used are LADDER, GRAFCET or FBD (Function Block Diagram), depending on the type of PLC used.

Benefits
- Introduction to the control system

To order

| MD1AE224 | Surface treatment operative part |
| MD1AE226TW | Twido surface treatment control part |
| MD1AE226 | TSX Micro surface treatment control part |
| MD1AE226MR | M340 surface treatment control part |
Wiring panel for intermediate certification

Learning objectives
- To configure the power meter
- To load the test program in the PLC
- To test general operation
- With the non-wired version, you can:
  - Install components as per the drawing
  - Wire up the power and control components
  - Wire up the Ethernet components
  - Configure the power meter
  - Load the test program in the PLC
  - Test general operation

Presentation
This wiring panel replicates the power and control circuits of a conveyor system with 2 carriers.

It is part of the teaching material for intermediate certification in two units of the French professional baccalaureate: UP1 (preparation for creating an electrical installation) and UP2 (verification of the operation of an electrical installation).

The panel is available in 2 versions:
- Non-wired panel (kit supplied as separate components)
- Panel wired and assembled

Main industry
- Electrical engineering

Characteristics

| Power supply  | 400 V |
| Dimensions (H x W x D) | 660 x 535 x 200 mm |
| Weight       | 15 kg |

Description

The panel kit comprises:
- 1 wiring panel
- 1 power incomer terminal block
- 1 x 24 VAC transformer
- 1 x 24 VDC power supply
- 1 set of circuit breakers
- 1 isolating switch
- 1 switch disconnector
- 1 x 4-pole busbar system
- 1 contactor
- 1 changeover contactor
- 1 thermal-magnetic circuit breaker
- 1 TeSys U motor starter with Modbus port
- 1 Twido PLC with Modbus port
- 1 power meter with 3 CTs
- 2 control boxes with buttons and indicators
- 1 terminal block for connecting the boxes and limit switches
- 5 limit switches

Benefits
- Specially-designed panel for intermediate level certification
- Choice between wired version and non-wired version
- Can be mounted in the containment cabinet (see page 108)

To order

| MD1AAPCBPNC    | Non-wired panel (separate kit components) |
| MD1AAPCBP      | Wired panel |

MD1AAPCBPNC Non-wired panel (separate kit components)
1 digital axis training bench
Digital axis

Learning objectives
- To learn about the different position control principles
- To understand the mechanical and dynamic phenomena associated with position control (acceleration, moving mass, accuracy, etc.)
- To set up a drive card

Main industries
- Electrotechnical engineering
- Automation engineering

Characteristics

| Power supply | 230 V/360 VA |
| Dimensions (H x W x D) | Operative part 400 x 920 x 430 mm 40 kg |
| Control part 600 x 560 x 310 mm 30 kg |
| Weight | | |

Presentation
This bench is used to study position and velocity servo control of a moving part. It is controlled by a Premium PLC with a drive card. This controls a servo-motor with brake and a tachogenerator. An encoder at the end of the shaft gives the position to the drive card. The carriage in the operative part can hold 3 different loads, and also 3 loads at the end of the shaft. The operative part can be positioned vertically.

Description

Operative part
- 1 variable-inertia axis with 600 mm stroke
- 1 variable-inertia moving part, driven by a ball screw
- 1 DC motor 200 W 300 rpm
- 1 drive card
- 1 x 400 pt/rev incremental encoder
- 1 mimic diagram with measuring points

Control cabinet
- 1 TSX57 Premium PLC with 8 inputs/16 outputs (discrete)
- 1 TSXCAY21 axis control module
- 1 Magelis XBT HMI terminal
- Protection and power supply circuits
- Removable connectors for connecting the operative part

Benefits
- Use of a drive card
- Control in open loop or closed loop mode
- Operative part can be used in horizontal or vertical position

To order
MD1AE793 Digital axis - control part
MD1AE794 Digital axis - operative part
Level control training bench
NIVOREG

Learning objectives
◆ To study the behaviour of a system
◆ process control with or without pure delay time
◆ To understand the parameters accuracy
◆ and stabilization of a process
◆ To study simple, cascaded or feedforward loops:
  ◆ P, PI, PD, PID with digital output
  ◆ two states ON/OFF with discrete output
  ◆ three states ON/OFF with outputs
  ◆ hot/cold with digital outputs
  ◆ split-range with digital outputs
  ◆ IMC (model-based controller) with digital output
  ◆ feedforward (predictive control) with digital output

Main industries
◆ Electrotechnical engineering
◆ Automation engineering
◆ Electrical engineering
◆ Engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/270 VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>700 x 780 x 450 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>46 kg</td>
</tr>
</tbody>
</table>

Presentation
The NIVOREG bench is used to study a process control system such as those found in continuous industrial processes.
The aim is to control water level and water flow in different system conditions/disturbances.
The bench consists of 2 water columns: one for the tank, the other for displaying the level control.
3 pumps are installed in the base to perform the filling, emptying and system disturbance functions.
A tap at the top of the tank means the system can operate in a stable or unstable state.

Description
This process control bench consists of a monobloc structure comprising:
◆ 1 operative part made up of 2 water columns
◆ 3 filling, emptying and disturbance pumps
◆ 1 control part with an M340 PLC
◆ 1 Magelis XBTGT terminal for controlling, configuring and displaying the curves
◆ 1 set of sensors for pressure, flow rate and level

Benefits
◆ Compact system
◆ Configuration of the various process control loops
◆ Operation on a touchscreen with graph plotter

To order
MD1AE885 | NIVOREG process control bench

164 Educational Solutions Catalogue - 2015/2016
Systems and subsystems

1 brushless axis training bench
XYLOPHONIS

Learning objectives
- To learn about the special features and capacities of brushless motors
- To use the different operating modes: position control, velocity or current
- To study the kinematic problems of positioning a moving part on a real-life system
- To calculate the kinematics and sizing of the assembly: drive, motor, gearbox, braking resistor
- To set up a Lexium servo drive
- To study the principles of servo control
- To control and configure:
  - in disconnected mode on the drive or using the PowerSuite software
  - remotely via the CANopen bus

Main industries
- Electrotechnical engineering
- Electrical engineering
- Engineering science

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/200 VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>680 x 780 x 460 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>50 kg</td>
</tr>
</tbody>
</table>

Presentation
The XYLOPHONIS bench replicates a Z axis in an industrial application which requires large dynamic displacement. It consists of a moving electromagnet with a variable load and a hammer to play the 14 xylophone keys. To avoid acoustic discomfort the hammer is on a ratchet mechanism. The motor-drive unit consists of a BSH brushless motor and a Lexium drive. The control system consists of a M340 PLC with CANopen bus to control the drive.

Description

Operative part
- 1 xylophone with fourteen notes
- 1 carriage guided on the vertical axis by two ball bushings, driven by a notched belt, stroke 330 mm
- 3 masses from 1 to 3 kg
- 1 x 1.4 Nm servo motor with encoder, 8:1 planetary gearbox, and holding brake
- 2 mechanical limit switches
- 1 detector for homing
- 1 safety limit switch on the access door

Control part
- 1 Twido or M340 PLC with 14 inputs/10 outputs (discrete) and a CANopen communication module
- 1 Lexium servo drive with CANopen bus
- 1 HMI terminal with prerecorded melody and 3 different tempos

Benefits
- Study of a position and velocity servo control system

To order

<table>
<thead>
<tr>
<th>MD1AE965TW</th>
<th>XYLOPHONIS (Twido version)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AE965MR</td>
<td>XYLOPHONIS (M340 version)</td>
</tr>
</tbody>
</table>

Electrical engineering
Engineering science

Operative part

1 xylophone with fourteen notes
1 carriage guided on the vertical axis by two ball bushings, driven by a notched belt, stroke 330 mm
3 masses from 1 to 3 kg
1 x 1.4 Nm servo motor with encoder, 8:1 planetary gearbox, and holding brake
2 mechanical limit switches
1 detector for homing
1 safety limit switch on the access door

Control part

1 Twido or M340 PLC with 14 inputs/10 outputs (discrete) and a CANopen communication module
1 Lexium servo drive with CANopen bus
1 HMI terminal with prerecorded melody and 3 different tempos
Pneumatic joystick with rotary actuator

Learning objectives
- To study and set up a pneumatic unit
- To program and run an automated system
- To make adjustments and maintain the pneumatic components

Main industries
- Electrical engineering
- Industrial maintenance
- Electrotechnical engineering
- Industrial maintenance
- Industrial maintenance

Characteristics

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>230 V/100 VA</td>
</tr>
<tr>
<td>Compressed air</td>
<td>5 bar</td>
</tr>
</tbody>
</table>
| Dimensions (H x W x D)  | Operative part: 400 x 467 x 400 mm 14 kg
|                         | Control part: 160 x 290 x 240 mm 4.3 kg
| Weight                  |                             |

Description

Operative part
- 1 air conditioning unit with manual valve and pressure gauge
- 1 soft starting unit with solenoid valve
- 5 bistable 5/2 directional control valves, 24 VDC electrical control
- 5 pneumatic actuators: rotating body, up/down, forward-back, rotation of grip, opening/closing of grip
- Inputs and outputs on safety sockets and Sub-D connector

Control part
- 1 control desk:
  - box with a connection diagram and safety sockets
  - operating and signalling controls for wiring the safety circuit and managing the run modes (automatic, manual and fault signalling)
- 1 set of safety leads

Option:
To create the automation sequence, we suggest using our panel-mounted TSX37, TSX57, M340 PLCs with a minimum of 16 I/O (see page 143).

Benefits
- Option of connecting a PLC on sockets or with Sub-D connectors
- Optimized GRAFCET program
- Use of different programming languages (LD and ST)

Presentation

The pneumatic arm is used to move a mechanical part with 5 degrees of freedom (2 rotations, 3 translational moves). Setup consists of running the wiring between the arms, the control desk and a PLC panel (not provided) using the set of cables.

The movement cycle should be programmed in Ladder (LD) or Structured Text (ST).

The equipment is made by FBO and marketed by Schneider Electric.

To order

| MD1AE973 | Control desk |
| MD1AE974 | Pneumatic joystick operative part |
Systems and subsystems

5-movement joystick

Learning objectives
- To analyze the various components and their effects (functional analysis)
- To take the wiring diagram into account
- To take the different run modes into account (GEMMA)
- To study and debug parts of the programs (from the simplest to the most sophisticated)
- To make adjustments and perform mechanical debugging
- To work on the electrical and mechanical parts

Main industries
- Industrial maintenance
- Industrial maintenance
- Industrial maintenance

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/130 VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressed air</td>
<td>6 bar</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>Operative part 580 x 820 x 520 mm 32 kg</td>
</tr>
<tr>
<td></td>
<td>TSX37 Micro control part 220 x 380 x 350 mm 4 kg</td>
</tr>
<tr>
<td></td>
<td>M340 control part 220 x 380 x 350 mm 4 kg</td>
</tr>
</tbody>
</table>

Benefits
- Working on WORDS and BITS
- Time delay and counter programming
- Use of different languages (SFC, ST, FBD)

Presentation
This equipment represents an industrial automatic assembly station. A cylindrical part is taken by the arm's gripper, laid on the punching station, and then removed. The system has 5 degrees of freedom for the arm and various sensors and actuators.

Description

Operative part
- Structure typically with secure access
- 1 product supply station
- 1 x 5-movement pneumatic joystick
  - double-acting cylinders
  - 3/2, 4/2 directional control valve
  - track grip system
- 1 punching station
- 1 station for removing parts
- 1 batch of parts
- 1 control desk

Control part
- 1 panel-mounted TSX37 Micro or M340 with 32 inputs/24 outputs (discrete)
- 1 set of rolled ribbon cables

To order

<table>
<thead>
<tr>
<th>MD1AE914</th>
<th>5-movement joystick operative part</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AE913</td>
<td>TSX Micro control part</td>
</tr>
<tr>
<td>MD1AE916MR</td>
<td>M340 control part</td>
</tr>
</tbody>
</table>
Systems and subsystems

Automatic part sorting subsystem
FORMATRIS

Learning objectives
- To analyze the system
- To analyze the identification technologies
- To study run and stop modes (GEMMA)
- To study GRAFCET
- To program in SFC
- To program in Structured Text
- To study linear measurement systems
- To study the load cell
- To program a 0-10 V 4-20 mA signal

Presentation
This equipment simulates an industrial automatic part sorting system according to a number of criteria: type of material, weight, dimensions. The application provided sets up the entire system and offers three run modes: automatic, jog and manual.

Main industries
- Industrial maintenance
- Industrial maintenance
- Industrial maintenance

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/200 VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>450 x 860 x 720 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>51 kg</td>
</tr>
<tr>
<td>Compressed air</td>
<td>6 bar</td>
</tr>
</tbody>
</table>

Description

Operative part
- 1 belt conveyor fitted with a geared motor
- 4 double-acting pneumatic cylinders
- 1 photoelectric cell
- 1 inductive sensor
- 2 capacitive sensors
- 1 x 0-10 V analog limit switch
- 1 4-20 mA analog load cell
- 12 parts to be sorted according to the following criteria:
  - type of material (plastic or metal)
  - weight of the part
  - dimensions and shape (presence of hole and/or groove)

Control part
- 1 TSX Micro or M340 PLC
- 1 programmable LCD HMI terminal
- Bistable 4/2 electro-pneumatic interfaces
- Control relays

Benefits
- Study of both discrete and analog sensors
- Compact equipment
- Programming in different languages

To order

<table>
<thead>
<tr>
<th>MD1AE955MI</th>
<th>FORMATRIS with TSX Micro PLC</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AE955MR</td>
<td>FORMATRIS with M340 PLC</td>
</tr>
</tbody>
</table>
Automated drilling system
PERCETRIS

Learning objectives
● To study and justify the various sensor technologies (photoelectric, inductive, capacitive, fibre optic, analog)
● To select and size electrical and pneumatic actuators
● To analyze and justify a pneumatic supply structure (isolator, blocker, directional control valve)
● To justify the choice of electrical protection components
● To configure drive operation
● To measure current and voltage at the motor terminals
● To program all or part of the production cycle (OR or AND cycle, hierarchical Grafcet, work on words, Ladder language, counter, time delay, etc.)
● To set up GEMMA loops
● To set up analog I/O cards

Main industries
● Industrial maintenance
● Automation engineering
● Industrial maintenance

Characteristics

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>230 V/3 kVA</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>1820 x 1450 x 600 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>175 kg</td>
</tr>
<tr>
<td>Compressed air</td>
<td>6 bar</td>
</tr>
</tbody>
</table>

Description
This industrial equipment can be used to create an automated manufacturing cycle for drilling a pulley wheel. The cycle is as follows: arrival of parts on the station, positioning, checking of the type of material, weight, size, drilling operation, sorting and removal on the basis of characteristics decided by the operator (parts OK/NOK).

To order
MD1AE825LMR | PERCETRIS system with M340 PLC
Systems and subsystems
Parcel sorting system
TAPIRIS

Learning objectives
- To set up automated management of a sorting system:
  - parcel identification and sorting
  - control system components, sensors, cylinders, variable speed drive
- To study and set up an ASi or CANopen bus
- To study communication on ASi, CANopen and Ethernet
- To communicate between PLC and PC (database)
- For electronic engineering: to study exchanges of data between the PLC and PC

Presentation
TAPIRIS simulates an automated parcel sorting station. The parcels are represented by cubes with a label containing a barcode and geometric shapes. They should be removed to one of the three containers. Sorting generates a database which can be used in a number of ways:
- The embedded web server in the PLC Ethernet module
- The Web Designer software to create customized HTML pages in the web server
- The OPC/OFS data server software with Excel, Visual Basic
- The belt and PLC panel communicate via ASi or CANopen bus.

Main industries
- Electronic engineering
- Electrical engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V/150 VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressed air</td>
<td>6 bar</td>
</tr>
</tbody>
</table>
| Dimensions (H x W x D)        | Operative part: 750 x 1730 x 540 mm, 32 kg
| Weight                        | Control part: 500 x 500 x 160 mm, 7 kg |

Description

Operative part
- 1 automatic parcel loading station
- 1 conveyor belt, 1.4 m long
- 1 x 180 W geared motor
- 1 Altivar drive cabinet
- 3 photoelectric cells to detect the passage of parcels
- 1 barcode scanner to identify the parcels
- 2 cylinder removal stations
- 1 set of parcels with identification labels

Control part
- 1 TSX37 Micro/TSX57 Premium/M340 PLC
- 1 ASi or CANopen module
- 1 Ethernet module
- 1 control station
- 1 XBT terminal

Benefits
- Use of an ASi or CANopen bus
- Data used with an OPC server
- Use of PLC web server

To order

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AE854T</td>
<td>TAPIRIS OP (ASi version)</td>
</tr>
<tr>
<td>MD1AE854TC</td>
<td>TAPIRIS OP (CANopen version)</td>
</tr>
<tr>
<td>MD1AE858</td>
<td>TAPIRIS CP (TSX Micro version)</td>
</tr>
<tr>
<td>MD1AE858P</td>
<td>TAPIRIS CP (Premium version)</td>
</tr>
<tr>
<td>MD1AE858MR</td>
<td>TAPIRIS CP (M340 CANopen version)</td>
</tr>
<tr>
<td>MD1AE858MRA</td>
<td>TAPIRIS CP (M340 ASi version)</td>
</tr>
</tbody>
</table>
### Stage lighting gantry

**Learning objectives**
- To prepare a site
- To make the area safe
- To set up and dismantle an installation
- To perform commissioning and maintenance
- To conduct a mechanical and kinematic study of a hoist
- To configure and adjust a variable speed drive

**Main industries**
- Industrial maintenance
- Industrial maintenance

**Characteristics**

| Power supply | 400 V |
| Dimensions (H x W x D) | |
| Gantry | 2500 x 2500 x 2500 mm |
| Cage | 300 x 1710 x 1710 mm |
| Control desk | 1150 x 800 x 505 mm |

**Description**

**Standard version**
- 1 collapsible gantry made of triangular aluminium beams
- 1 moving cage whose position and velocity are servo controlled by 4 motors with encoders
- 4 x 125 daN chain hoists, 1 of which has a rope drive, slings and fixing clamps
- 1 x chain hoist for assembly/dismantling operations
- 1 base-mounted control desk with Twido PLC, with braked castors
- Altivar drives on CANopen bus and graphic display terminal
- 1 set of connecting cables with connectors
- 2 storage trolleys mounted on braked castors: o for the gantry and the cage o for the 5 hoists and set of cables
- Accessories:
  - 1 x 150 daN weight indicator
  - 1 strain gauge, 0-10 V analog output

**Available as an option**
- 1 set of 4 colour LED spotlights
- 1 pre-wired electrical cabinet, for simulating repair of a hoist

**Benefits**
- Equipment assembly/dismantling operations
- Assembly designed for frequent operations
- Drives controlled for the cage position

**Presentation**

This equipment is typical of that used by professionals in the industrial or entertainment worlds. It is designed for studying setup and maintenance of a collapsible stage lighting gantry consisting of a fixed part and a moving cage.

A graphic display terminal is used to control the motors and adjust the cage position.

Two programs to handle the cage and a program to control spotlights are installed in the PLC.

The equipment is made by ELECTRONA and marketed by Schneider Electric.

**To order**

| MD1AA770 | Stage lighting gantry |
| UERGJSL | Set of LED spotlights |
| UERGCOFINT | Practice cabinet |
Industrial packaging machine
Shrink wrapper

Learning objectives
● To commission an installation safely
● To communicate on Ethernet, CANopen and Modbus networks
● To change production
● To perform maintenance:
  ○ configure the temperature controller
  ○ troubleshoot problems with the bar cycle
  ○ repair a silicon-coated counterbar
● To study energy efficiency:
  ○ measure energy consumption
  ○ temperature control of the travelling sealing bar
  ○ temperature control of the tunnel
  ○ variable speed control

Presentation
This industrial packaging machine is a manually-loaded shrink wrapper for agri-foodstuffs.

Description
Industrial shrink wrapper comprising the following equipment:
● Motorized upper film flow controller
● Travelling sealing bar
● Shrink tunnel
● Cooler
● Encasing
● Conveyor with square bars
● Centralized lubrication
● Multi-step detection
● Making the sealing bar safe
● Specific equipment:
  ○ 30 kW twin-turbine tunnel
  ○ roller outfeed
● Control system:
  ○ SoMachine or Pack Drive
  ○ supervision interface

Main industries
● Electrotechnical engineering
● Maintenance
● Production

Characteristics
<table>
<thead>
<tr>
<th>Power supply</th>
<th>400 V/40 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>2070 x 5500 x 1450 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>1000 kg</td>
</tr>
</tbody>
</table>

Benefits
● Mechanical cam for moving the sealing bar
● Energy efficiency study with high power
● Consumables provided

To order
MD1FARD | Industrial shrink wrapper

Mechanical cam for moving the sealing bar
Integrated production system
PRODUCTIS

Learning objectives
- To use an integrated system for packaging tablets
- To set up multi-product production management with a combination of manual and automatic stations
- To study how a workshop is organized (time management, production changeovers, quality monitoring)
- To carry out maintenance operations:
  - dismantling/reassemble of stations (4-station version)
  - replacing sensors
  - sensor cylinder adjustments
  - troubleshooting

Presentation
PRODUCTIS replicates a pharmaceutical packaging line. Beads representing tablets are distributed into bottles. The system consists of 2 filling stations and 2 capping stations. A wire mesh conveyor transfers pallets holding the bottles from station to station. With 2 bead colours and 2 bottle heights, numerous different types of production are possible. In its standard 4-station version, 2 stations (capping and filling) can be dismantled for maintenance to be performed mechanically away from the machine (mechanical stands provided). In the 2-station version, the stations are fixed and adjustments are made on the machine. The capping and filling stations with their stands are also sold separately as subsystems for practising maintenance operations. If mounted on PRODUCTIS they will be recognized by the control system.

Main industries
- Automation engineering
- Automation engineering
- Mechanical engineering
- Engineering

Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>Power supply</th>
<th>400 V/2.6 kVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>1850 x 1150 x 2150 mm</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>340 kg</td>
<td></td>
</tr>
<tr>
<td>Compressed air</td>
<td>6 bar</td>
<td></td>
</tr>
</tbody>
</table>

2-station version
Same composition with just 1 filling station and 1 capping station

Subsystem
Subsystems are supplied with a stand for assembly and cables with flying leads.

Benefits
- PRODUCTIS runs with reusable bottles and beads: no consumables
- Compact equipment
- System with realistic industrial proportions

To order

<table>
<thead>
<tr>
<th>MD1AE905MR</th>
<th>PRODUCTIS M340 with 4 stations</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AE905MR2P</td>
<td>PRODUCTIS M340 with 2 stations</td>
</tr>
<tr>
<td>MD1AE903</td>
<td>Bottle filling station</td>
</tr>
<tr>
<td>MD1AE904</td>
<td>Bottle capping-inspection station</td>
</tr>
</tbody>
</table>
Flexible dosing line

Learning objectives
- To learn about a flexible dosing line in the pharmaceutical field
- To run, manage, adjust and control an industrial flexible line
- To carry out maintenance operations
- To manage production flows and the manufacturing range
- To study control systems and communication networks

Main industries
- Industrial maintenance
- Industrial maintenance
- Mechanical engineering
- Engineering

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>400 V/12 kVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>1850 x 3650 x 1350 mm</td>
</tr>
</tbody>
</table>

Presentation
The flexible dosing line is a combination of 3 complementary devices:
- PRODUCTIS (see page 173)
- the Pick and Place joystick (BEMA)
- the logistics storage system (BEMA)
Performs the following operations:
- automatic feeding of bottles and caps
- distributing tablets into the bottles
- capping the bottles and discarding any products declared NOK
- packing capped bottles in a box
- automatically removing the box
- storage in defined areas, counters
The tablets, bottles, caps and boxes can be reused.
Equipment developed jointly with BEMA.

Description
- The joystick is responsible for:
  - supply
  - unloading
  - putting bottles from the PRODUCTIS unit into boxes
It has 6 storage magazines (bottles, caps and box) and can manage 2 box fill operations simultaneously. Once a box is full, it is automatically removed to the storage area.
- The purpose of the logistics storage system is to dispatch the boxes into 5 different storage areas according to storage commands that are either programmed or come from upstream production zones.
For a detailed configuration, please contact us.

Benefits
- Compact industrial line
- 6 workstations
- Numerous manufacturing combinations

To order

| MD1AE905MR | PRODUCTIS M340 with 4 stations |
| UERGLFDOSES | Joystick + storage system |
| UERGLFDOSEIMP | Labelling machine + barcode printing software |
Packaging line
Sleeving

Learning objectives
- To perform commissioning
- To make mechanical and pneumatic adjustments
- To control a line
- To change production
- To perform diagnostics
- To automate the line
- To study diagrams
- To produce a mechanical design
- To study different wave technologies

Presentation
With this industrial packaging line, the products are overwrapped in sleeves, labelled, then placed in trays. The line performs the following functions:
- Selecting a product to overwrap
- Unstacking the sleeve on the filling station
- Checking that products and sleeves are present on the various stations
- Transferring products, sleeves
- Unloading the sleeve
- Option of dummy run operation (without sleeving)

The consumables - products, sleeves and master trays - can be reused.

Main industries
- Maintenance
- Production
- Electrotechnical engineering
- Engineering

Characteristics

| Power supply | 400 V/10 kW |
| Dimensions (H x W x D) | 2000 x 3000 x 1000 mm |
| Compressed air | 6 bar |

Description
- Synchronous motor
- Asynchronous motor
- Variable speed drive
- Linear cylinder
- Sercos axis controller
- Safety module on Sercos
- Touchscreen HMI
- Ethernet network, Sercos III bus

Benefits
- Multi-technology industrial machine
- Multi-discipline teaching equipment
- Can be operated using an iPad

To order
UEHG FOURREAU |Sleeving packaging line
Packaging line
Tray packing

Learning objectives
- To perform commissioning
- To make mechanical and pneumatic adjustments
- To control a line
- To change production
- To perform diagnostics
- To automate the line
- To study diagrams
- To produce a mechanical design
- To study different technologies

Presentation
With this industrial packaging line, the products are overwrapped in sleeves, labelled, then placed in trays. The line performs the following functions:
- Checking that trays and sleeves are present on the various stations
- Transferring sleeves to the tray packing station
- Picking up the sleeve with a vacuum gripper
- Aligning the sleeve correctly
- Inserting sleeves to create 2 rows of 3 products in 2 layers
- Removing the full tray
The consumables - products, sleeves and master trays - can be reused.

Main industries
- Maintenance
- Production
- Electrotechnical engineering
- Engineering

Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>Power supply</th>
<th>400 V/10 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>2000 x 3500 x 1500 mm</td>
<td></td>
</tr>
<tr>
<td>Compressed air</td>
<td>6 bar</td>
<td></td>
</tr>
</tbody>
</table>

Description
- 3-axis robot
- Synchronous motor
- Asynchronous motor
- Variable speed drive
- Linear cylinder
- Sercos axis controller
- Safety module on Sercos
- Touchscreen HMI
- Ethernet network, Sercos III bus

Benefits
- Multi-technology industrial machine
- 3-axis robot
- Can be operated using an iPad

To order
UEHG BARQUETTE | Tray packing line
Assembly line
Linking assembly stations

Learning objectives
- To learn about and gain expertise in industrial control systems
- To study components that use different technologies: pneumatic, detection, electrotechnical
- To perform a functional and structural analysis
- To study the wiring diagrams
- To analyze components and electrical wiring
- To perform commissioning
- To run and control a line
- To program, modify a program
- To adjust, change a production range
- To carry out repairs

Presentation
The transfer line described in this offer can be used to create a linear assembly line by linking the stations described in pages 178 to 183 (references containing ...AES...) around a central transfer system, with a maximum of 8 stations. The parts (base, bearing, shaft, screws, cover) are assembled in stages via a pallet which travels from station to station until it reaches the inspection station. This equipment is made by SMC and marketed by Schneider Electric.

Alternative
To create a modular assembly line, we suggest a version in which each station has its own mini-transfer system (references containing ...AESM..., pages 172 to 182).

Main industries
- Automation engineering
- Industrial maintenance
- Mechanical engineering
- Engineering

Characteristics

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>230 V</td>
</tr>
<tr>
<td>Compressed air</td>
<td>6 bar</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>Transfer line only</td>
</tr>
<tr>
<td></td>
<td>1040 x 4250 x 700 mm</td>
</tr>
<tr>
<td></td>
<td>200 kg</td>
</tr>
</tbody>
</table>

Description

- Control and monitoring cabinet with variable speed drive, M340 PLC, Ethernet and fieldbus
- End stops, elevators and rotary pallet systems
- Transport pallet with binary identification system

Available as an option
RFID pallet identification system

Benefits
- Numerous manufacturing options
- Line can be added to over time
- Fault creation device

To order

<table>
<thead>
<tr>
<th>MD1AESC</th>
<th>Transfer line</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AESCRF</td>
<td>RFID option for transfer line</td>
</tr>
</tbody>
</table>

Stations in a line + transfer

Modular stations
Assembly line (continued)

Base supply and bearing insertion stations

Learning objectives

● To learn about and gain expertise in industrial control systems
● To study components that use different technologies: pneumatic, detection, electrotechnical
● To perform a functional and structural analysis
● To study wiring diagrams
● To perform electrical wiring
● To perform commissioning
● To run and control a line
● To program, modify a program
● To adjust or change a production range
● To carry out repairs

Presentation

Automated assembly stations (pages 177 to 183) can be used to study automation functions and component technologies. They can be integrated around a pallet transfer system (maximum of 8 stations, see page 177). They are also available in a version with an integrated transfer system. The first station in this offer supplies the bases, the second station fits the bearings on the bases (see details below). For a wider range of options, bearings can be fitted of different heights. The equipment is made by SMC and marketed by Schneider Electric.

Description

Elements common to all stations:

● 1 electrical mounting plate (550 x 400 mm)
● 1 M340 Ethernet PLC

Base supply station
Performs the following operations:

● Supplying bases
● Checking the base position
● Transporting the base
● Discarding incorrect bases
● Insertion in the pallet indentation

Bearing insertion station
Performs the following operations:

● Supplying bearings
● Transfer to the measuring station
● Measuring the bearing height
● Inserting the bearing

Version with integrated transfer system

● 1 conveyor belt integrated in the station, equipped with a pallet indexer (remote I/O on Ethernet)

Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>230 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressed air</td>
<td>6 bar</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td></td>
</tr>
<tr>
<td>Base supply station</td>
<td>1480 x 900 x 580 mm</td>
</tr>
<tr>
<td></td>
<td>120 kg</td>
</tr>
<tr>
<td>Bearing insertion station</td>
<td>1430 x 900 x 580 mm</td>
</tr>
<tr>
<td></td>
<td>120 kg</td>
</tr>
</tbody>
</table>

Benefits

● Numerous manufacturing options
● Operation as standalone stations or in a line
● Fault creation device

To order

<table>
<thead>
<tr>
<th>MD1AES1</th>
<th>Base supply station</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AESM1</td>
<td>Base supply station with integrated transfer system</td>
</tr>
<tr>
<td>MD1AES2</td>
<td>Bearing insertion station</td>
</tr>
<tr>
<td>MD1AESM2</td>
<td>Bearing insertion station with integrated transfer system</td>
</tr>
</tbody>
</table>
Assembly line
Hydraulic press and shaft fitting stations

Learning objectives
- To learn about and gain expertise in industrial control systems
- To study components that use pneumatic technology
- To perform a functional and structural analysis
- To study temperature regulation
- To study wiring diagrams
- To analyze components and electrical wiring
- To perform commissioning
- To run and control a line
- To program, modify a program
- To adjust or change a production range
- To carry out repairs

Main industries
- Automation engineering
- Industrial maintenance
- Industrial maintenance
- Mechanical engineering
- Engineering

Characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>230 V</td>
</tr>
<tr>
<td>Compressed air</td>
<td>6 bar</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td></td>
</tr>
<tr>
<td>Press station</td>
<td>1400 x 900 x 580 mm</td>
</tr>
<tr>
<td></td>
<td>120 kg</td>
</tr>
<tr>
<td>Shaft station</td>
<td>1800 x 900 x 580 mm</td>
</tr>
<tr>
<td></td>
<td>120 kg</td>
</tr>
</tbody>
</table>

Hydraulic press station
Performs the following operations:
- Inserting the base + bearing assembly
- Supplying the press
- Pressing the bearing
- Taking out the assembly

Shaft fitting station
Performs the following operations:
- Supplying shafts to a rotary table
- Measuring the shaft height
- Detecting the shaft material
- Ejecting non-conforming shafts
- Inserting the shaft in the bearing

Version with integrated transfer system
- 1 conveyor belt integrated in the station, equipped with a pallet indexer (remote I/O on Ethernet)

Presentation
Automated assembly stations (pages 177 to 183) can be used to study automation functions and component technologies. They can be integrated around a pallet transfer system (maximum of 8 stations, see page 177). They are also available in a version with an integrated transfer system.

The first station in this offer applies hydraulic pressure to a bearing. The second station is used to supply and insert a shaft in the bearing (see details below).

For a wider range of options, there are 2 types of shaft.

The equipment is made by SMC and marketed by Schneider Electric.

Benefits
- Numerous manufacturing options
- Operation as standalone stations or in a line
- Fault creation device

To order

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AES3</td>
<td>Hydraulic press station</td>
</tr>
<tr>
<td>MD1AESM3</td>
<td>Hydraulic press station with integrated transfer system</td>
</tr>
<tr>
<td>MD1AES4</td>
<td>Shaft fitting station</td>
</tr>
<tr>
<td>MD1AESM4</td>
<td>Shaft fitting station with integrated transfer system</td>
</tr>
</tbody>
</table>
Assembly line (continued)
Cover fitting and screw fitting stations

Learning objectives
- To learn about and gain expertise in industrial control systems
- To study components that use different technologies: pneumatic, electrotechnical
- To perform a functional and structural analysis
- To study wiring diagrams
- To analyze components and electrical wiring
- To perform commissioning
- To run and control a line
- To program, modify a program
- To adjust or change a production range
- To carry out repairs

Presentation
Automated assembly stations (pages 177 to 183) can be used to study automation functions and component technologies. They can be integrated around a pallet transfer system (maximum of 8 stations, see page 177). They are also available in a version with an integrated transfer system. The first station in this offer fits a cover on an assembly. The second station is used to supply and insert screws in the base (see details below). For a wider range of options, there are 6 different types of cover. The equipment is made by SMC and marketed by Schneider Electric.

Main industries
- Automation engineering
- Industrial maintenance
- Industrial maintenance
- Mechanical engineering
- Engineering

Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>Power supply</th>
<th>Compressed air</th>
<th>Dimensions (H x W x D)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elements common to all stations:</td>
<td>230 V</td>
<td>6 bar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cover fitting station</td>
<td></td>
<td></td>
<td>Cover station</td>
<td></td>
</tr>
<tr>
<td>Performs the following operations:</td>
<td></td>
<td></td>
<td>1400 x 900 x 580 mm</td>
<td>120 kg</td>
</tr>
<tr>
<td>Supplying covers to a rotary table</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loading a cover</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detecting the material</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measuring the cover</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ejection of non-conforming covers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inserting the cover</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Screw fitting station</td>
<td></td>
<td></td>
<td>Screw station</td>
<td></td>
</tr>
<tr>
<td>Performs the following operations:</td>
<td></td>
<td></td>
<td>1930 x 900 x 580 mm</td>
<td>120 kg</td>
</tr>
<tr>
<td>Supplying screws</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transferring pallets</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manipulating screw insertion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Version with integrated transfer system</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 conveyor belt integrated in the station, equipped with a pallet indexer (remote I/O on Ethernet)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Benefits
- Numerous manufacturing options
- Operation as standalone stations or in a line
- Fault creation device

To order

<table>
<thead>
<tr>
<th>MD1AES5</th>
<th>Cover insertion station</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AESM5</td>
<td>Cover insertion station with integrated transfer system</td>
</tr>
<tr>
<td>MD1AES6</td>
<td>Screw insertion station</td>
</tr>
<tr>
<td>MD1AESM6</td>
<td>Screw insertion station with integrated transfer system</td>
</tr>
</tbody>
</table>
**Systems and subsystems**

**Assembly line**

**Robot and warehousing stations**

---

### Learning objectives

- To learn about and gain expertise in industrial control systems
- To study components that use different technologies: pneumatic, electrotechnical, robotics
- To perform a functional and structural analysis
- To study wiring diagrams
- To analyze components and electrical wiring
- To perform commissioning
- To run and control a line
- To program, modify a program
- To adjust or change a production range
- To carry out repairs

### Presentation

Automated assembly stations (pages 177 to 183) can be used to study automation functions and component technologies. They can be integrated around a pallet transfer system (maximum of 8 stations, see page 177). They are also available in a version with an integrated transfer system.

The first station in this offer is a robot that performs screwing, assembly and disassembly operations.

The second station takes finished products on the main conveyor pallet, and stores them in a warehouse according to the instructions from the supervision system or from a local HMI (see details below).

The equipment is made by SMC and marketed by Schneider Electric.

### Description

**Elements common to all stations:**
- 1 electrical mounting plate (550 x 400 mm)
- 1 M340 Ethernet PLC

**5-axis robot station protected by a cover**

Performs the following operations:
- Screwing in 4 screws
- Assembly and disassembly of elements stored in 2 zones

**Finished product storage station**

Performs the following operations:
- Storage by 2-axis electrical gantry robot
- Arranging items by position

**Available as an option**

- Touchscreen HMI

**Version with integrated transfer system**

- 1 conveyor belt integrated in the station, equipped with a pallet indexer (remote I/O on Ethernet)

---

### Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Power supply</th>
<th>Compressed air</th>
<th>Dimensions (H x W x D)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robot station</td>
<td>230 V</td>
<td>6 bar</td>
<td>1500 x 900 x 580 mm</td>
<td>120 kg</td>
</tr>
<tr>
<td>Storage station</td>
<td></td>
<td></td>
<td>1500 x 900 x 580 mm</td>
<td>135 kg</td>
</tr>
</tbody>
</table>

---

### Benefits

- Numerous manufacturing options
- Operation as standalone stations or in a line
- Fault creation device

---

### To order

- **MD1AES7** 5-axis robot station
- **MD1AESM7** 5-axis robot station with integrated transfer system
- **MD1AES8** Automatic warehousing station
- **MD1AESM8** Automatic warehousing station with integrated transfer system
- **MD1AEIH8** Optional HMI touch screen
Assembly line (continued)

Paint and quality control stations

Learning objectives
- To learn about and gain expertise in industrial control systems
- To study components that use different technologies: electrical shaft
- To understand industrial communication (CANopen, Ethernet)
- To study the vision sensor
- To study the brushless motor
- To analyze temperature regulation
- To perform a functional and structural analysis
- To study wiring diagrams
- To analyze components and electrical wiring
- To perform commissioning
- To run and control a line
- To program, modify a program
- To adjust or change a production range
- To carry out repairs

Main industries
- Automation engineering
- Industrial maintenance
- Industrial maintenance
- Mechanical engineering
- Engineering

Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>230 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressed air</td>
<td>6 bar</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>1500 x 900 x 580 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>120 kg</td>
</tr>
</tbody>
</table>

Paint station
- Performs the following operations:
  - Inserting the assembly in the oven (simulated)
  - Drying operation with regulation
  - Taking out the assembly

Artificial vision quality control station
- Performs the following operations:
  - Inserting/taking out the assembly
  - Laying down on rotary table
  - Inspection by artificial vision system
  - Removal of defective products

Version with integrated transfer system
- 1 conveyor belt integrated in the station, equipped with a pallet indexer (remote I/O on Ethernet)

Benefits
- Numerous manufacturing options
- Operation as standalone stations or in a line
- Fault creation device

To order

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1AES9</td>
<td>Paint station</td>
</tr>
<tr>
<td>MD1AESM9</td>
<td>Paint station with integrated transfer system</td>
</tr>
<tr>
<td>MD1AES10</td>
<td>Quality control station</td>
</tr>
<tr>
<td>MD1AESM10</td>
<td>Quality control station with integrated transfer system</td>
</tr>
</tbody>
</table>
**Learning objectives**
- To learn about and gain expertise in industrial control systems
- To study components that use different technologies: pneumatic, electrotechnical, detection, variable speed control, communication
- To perform a functional and structural analysis
- To study wiring diagrams
- To analyze components and electrical wiring
- To perform commissioning
- To run and control a line
- To program, modify a program
- To adjust or change a production range
- To carry out repairs

**Main industries**
- Automation engineering
- Industrial maintenance
- Industrial maintenance
- Mechanical engineering
- Engineering

**Characteristics**

| Recommended configuration       | Windows XP, Vista, Windows 7 |

**Presentation**

The supervision system is used to represent the configuration of an industrial assembly line (pages 177 to 182) and to control the whole system and manage production. It records events and alarms and generates logs. It has a similar graphic interface to the real-life system, with animations.

The simulation system replicates the manufacturing stages on the various mounting stations. It can be used to practise control and programming without risking damage to the real-life system.

The equipment is made by SMC and marketed by Schneider Electric.

**Description**

- **Supervision**
  - application on a PC
  - 1 production monitoring view
  - 1 view per station
  - 1-station license
- **Simulation**
  - application on a PC
  - 3D views per station
  - 1-station license

**Benefits**

- Control of a production line
- Independent simulation of the line

**To order**

<table>
<thead>
<tr>
<th>MD1 AESSUP</th>
<th>Supervision system</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1 AESIM</td>
<td>Simulation of assembly stations</td>
</tr>
</tbody>
</table>
VIRTUAL UNIVERSE PRO 3D simulator

Learning objectives
- To create 3D models or complementary parts from an object library
- To test control systems, electrical and pneumatic diagrams in tandem with supply systems
- To validate PLC programs
- To simulate behaviour
- To check anticipated performance
- To work on tasks: preparing the system recipe with the customer
- To create interactive presentations
- To train operators

Main industry
- Automation engineering

Characteristics

Recommended configuration

| Software bundle in the form of a software key. Windows XP, Vista, Windows 7 and 8 (32 and 64-bit) |

Description
- NVIDIA PhysX 3D motor using Newton’s method
- Automatic import of digital models from SOLIDWORKS, INVENTOR, CATIA
- Automatic import of 3D file formats: 3DXML, 3DS, OBJ, etc.
- Electrical, pneumatic, hydraulic diagram editor
- HMI editor for creating a control desk
- Integrated controller (Grafce, Ladder, etc.) for:
  - completing the PLC part
  - configuring customized behaviour
- Discrete and analog control
- Simultaneous connection and viewing the status of the UNITY or SOMACHINE program
- Integration of several cameras and configuration of the décor
- Collision management

To order:
x: number of VUP licenses (1 = 1 station, 2 = 10 stations, 3 = academic site)
y: number of PLCs (1 = 1 PLC/2 = 5 PLCs/3 = 10 PLCs)
z: type of PLC (1 = M238, 2 = M340 Modbus, 3 = M340 Ethernet)

Benefits
- Intuitive and user-friendly configuration
- 3D models can be optimized for greater fluidity
- Programming task freed up from the need for an operative part

To order

<table>
<thead>
<tr>
<th>MDSIMUIRAxyz</th>
<th>VUP license with or without PLC (xyz: see above)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDSIMUIRA100</td>
<td>1 station without PLC</td>
</tr>
<tr>
<td>MDSIMUIRA200</td>
<td>10 stations without PLC</td>
</tr>
<tr>
<td>MDSIMUIRA300</td>
<td>Academic site license, without PLC</td>
</tr>
</tbody>
</table>

Please contact us for other references
BipBop offer
# Chapter 5

## BipBop offer

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>BipBop programme</td>
<td>188</td>
</tr>
<tr>
<td>Motor starter cabinet</td>
<td>189</td>
</tr>
<tr>
<td>Domestic cabinet</td>
<td>190</td>
</tr>
<tr>
<td>Electrical hazards awareness cabinet</td>
<td>191</td>
</tr>
<tr>
<td>Reactive power factor correction cabinet</td>
<td>192</td>
</tr>
<tr>
<td>Earthing systems and discrimination cabinet</td>
<td>193</td>
</tr>
<tr>
<td>Solar-powered water extraction</td>
<td>194</td>
</tr>
<tr>
<td>Traffic lights and lift</td>
<td>195</td>
</tr>
</tbody>
</table>
BipBop Programme

Schneider Electric is implementing a sustainable development programme designed to provide a reliable, affordable and clean electricity supply to those who need it most worldwide.

This strategy - known as BipBop (Business, Innovation and People at the Base Of the Pyramid*) - is one of the company's Corporate Social Responsibility initiatives.

The BipBop programme involves local communities and stakeholders in each country working together to tackle three major obstacles to providing sustainable access to electricity, namely:

- lack of financial resources
- lack of equipment for accessing energy
- lack of skills and expertise

*BOP = Base Of the Pyramid, an expression used to refer to the world’s poorest people in a given country.
Motor starter cabinet

**Description**
This cabinet is designed for wiring different types of motor starter. The transparent cover allows students to see the components. The components are wired using safety leads.

**Characteristics**

| Power supply | 400 V/250 VA |
| Dimensions (H x W x D) | 240 x 720 x 600 mm |
| Weight | 20 kg |

**Accessories provided**
- 1 power lead
- 1 set of 4 mm safety leads
- 1 set of 2 mm safety leads

**Technical data**
- 400/690 V, 180 W motor adapted for training purposes
- 1300 rpm asynchronous motor with inertia wheel, mounted on plinth
- Safety sockets for motor winding and earth connections

**Learning objectives**
- To learn about motor starter wiring diagrams: star-delta and reversing
- To set up an asynchronous machine
- To study contactors and motor protection devices
- To select the type of motor starter according to different criteria

**Main industries**
- Electrotechnical engineering
- Industrial maintenance

**Benefits**
- Compact equipment
- Low-cost solution
- Rugged wiring on safety sockets

**Presentation**
- To order

**To order**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3BPDM</td>
<td>BipBop motor starter cabinet</td>
</tr>
<tr>
<td>MD1AMPO13</td>
<td>400/690 V, 180 W motor adapted for training purposes</td>
</tr>
</tbody>
</table>
Domestic cabinet

Learning objectives
- To install components: one-way and two-way switches, sockets, etc.
- To study the function of each component
- To set a programmable timer switch
- To study the impulse relay function

Presentation
This cabinet is designed for learning how to wire the basic functions required in a domestic or small business installation, including impulse relays, timers, timer switches and light-sensitive switches. The transparent cover allows students to see the components. The components are wired using safety leads.

Main industry
- Electrician in the building sector

Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>Power supply 230 V/10 A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>240 x 720 x 600 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>16 kg</td>
</tr>
</tbody>
</table>

To order
MD3BPDOM | BipBop domestic cabinet

Benefits
- Compact equipment
- Low-cost solution
- Rugged wiring on safety sockets

Accessories provided
- 1 power lead
- 1 set of 4 mm safety leads
**BipBop offer**

**Educational Solutions Catalogue - 2015/2016**

---

**Learning objectives**
- To make non-electricians aware of electrical hazards
- To use PPE and CPE
- To carry out basic operations on LV equipment in safe conditions
- To identify and lock out electrical circuits before working on them
- To measure an installation

**Main industries**
- Electrotechnical engineering
- Energy engineering
- Industrial maintenance
- Electrical engineering

**Characteristics**

<table>
<thead>
<tr>
<th><strong>Description</strong></th>
<th><strong>Presentation</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Learning objectives</strong></td>
<td>This cabinet is used to make students aware of the electrical hazards present in a domestic or industrial environment. Students equipped with their PPE will make the installation safe before working on the equipment.</td>
</tr>
<tr>
<td><strong>Presentation</strong></td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td>The domestic distribution part on the front panel of the cabinet comprises 3 circuits protected by circuit breakers:</td>
</tr>
<tr>
<td>400 V/250 VA</td>
<td>- 1 domestic socket and 1 cable gland plate</td>
</tr>
<tr>
<td><strong>Dimensions (H x W x D)</strong></td>
<td>- 1 domestic socket</td>
</tr>
<tr>
<td>610 x 690 x 360 mm</td>
<td>- 1 switch and a light</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>The industrial part inside the cabinet comprises:</td>
</tr>
<tr>
<td>27 kg</td>
<td>- 1 padlockable switch disconnecter</td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td>- 1 splitter box with removable protection</td>
</tr>
<tr>
<td>400 V/250 VA</td>
<td>- 1 thermal-magnetic circuit breaker</td>
</tr>
<tr>
<td><strong>Dimensions (H x W x D)</strong></td>
<td>- 1 contactor with auxiliary contact block</td>
</tr>
<tr>
<td>610 x 690 x 360 mm</td>
<td>- 1 motor connection to double-recess sockets</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>- 1 mushroom head emergency stop button</td>
</tr>
<tr>
<td>27 kg</td>
<td>- 2 indicators and 1 start button</td>
</tr>
<tr>
<td><strong>Accessories provided</strong></td>
<td><strong>Benefits</strong></td>
</tr>
<tr>
<td>1 power lead</td>
<td>- Compact equipment</td>
</tr>
<tr>
<td>1 set of 4 mm safety leads</td>
<td>- Low-cost solution</td>
</tr>
<tr>
<td>Fuses, socket outlets, protective covers, locking device, etc.</td>
<td>- Rugged wiring on safety sockets</td>
</tr>
<tr>
<td>230/400 V, 180 W motor adapted for training purposes</td>
<td><strong>To order</strong></td>
</tr>
<tr>
<td>1300 rpm asynchronous motor with inertia wheel, mounted on plinth</td>
<td>MD3BPSRE</td>
</tr>
<tr>
<td>Safety sockets for the earth and motor winding connections</td>
<td>MD1AMP001</td>
</tr>
<tr>
<td>Voltage tester and PPE kit</td>
<td>MD1AA639</td>
</tr>
</tbody>
</table>

---

**To order**

- MD3BPSRE: BipBop electrical hazards awareness cabinet
- MD1AMP001: 230/400 V, 180 W motor adapted for training purposes
- MD1AA639: Voltage tester and PPE kit
BipBop offer

Reactive power factor correction cabinet

Learning objectives
- To measure electrical values and phase shift
- To analyze reactive power consumption
- To study reactive power factor correction
- To install power factor correction capacitors
- To study overcorrection

Presentation
This reactive power factor correction cabinet is equipped with 3 lights (linear loads) and 1 induction coil (non-linear load) to generate a phase shift. Correction is performed using a set of 8 capacitors. Each element is controlled separately. Current and voltage measuring points are on the side of the cabinet.

Main industry
- Electrotechnical engineering

Characteristics

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>230 V/1.3 kVA</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>610 x 700 x 350 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>40 kg</td>
</tr>
</tbody>
</table>

Description
The reactive power factor correction cabinet includes the following components:
- 3 halogen lights with dimmer control
- 1 phase shift inductor
- 8 capacitors
- 13 wired selector switches for creating different types of circuit:
  - 8 for the capacitors
  - 3 for the lights
  - 1 for the phase shift inductor
  - 1 for the dimmer bypass
  - 1 dimmer switch
  - 1 measuring point for current drawn
  - 1 measuring point for the AC supply voltage
  - 1 power lead

Benefits
- Compact equipment
- Low-cost solution
- Rugged wiring on safety sockets

To order
MD3BPCER BipBop reactive power factor correction cabinet
**Learning objectives**
- To study the different earthing systems
- To study what protection devices are used for and how they work
- To select the most suitable means of protection for an installation
- To determine the fault currents
- To study current and time discrimination

**Presentation**

This earthing systems cabinet is designed for studying how to protect people and equipment in a TT system installation. The equipment comprises different electrical protection devices and resistors for simulating a person or various devices connected to the grid.

**Description**

The earthing systems cabinet includes the following components:
- 1 isolation transformer
- 1 set of resistors
- 1 Vigirex residual current relay
- 1 circuit breaker with shunt trip
- 1 x 300 mA RCBO
- 1 x 30 mA RCBO

**Main industry**
- Electrotechnical engineering

**Characteristics**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>400 V/250 VA</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>240 x 720 x 600 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>20 kg</td>
</tr>
</tbody>
</table>

**Accessories provided**
- 1 pushbutton to create the fault
- 1 general-purpose circuit breaker
- 1 power cable
- 1 set of 4 mm safety leads

---

**To order**

MD3BPSLT

BipBop earthing systems cabinet
Solar-powered water extraction
SOLAR WATER

Learning objectives
- To learn about and set up the water extraction bench
- To study how to operate, configure and maintain ATV 312 Solar drives
- To size the photovoltaic panels needed for the bench to work

Main industry
- Electrotechnical engineering

Characteristics

<table>
<thead>
<tr>
<th>Description</th>
<th>Power supply</th>
<th>Dimensions (H x W x D)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOLAR WATER extraction bench</td>
<td>230 V/180 W</td>
<td>730 x 700 x 390 mm</td>
<td>40 kg empty/55 kg full</td>
</tr>
</tbody>
</table>

Presentation
The SOLAR WATER bench replicates a Schneider Electric stand-alone solar-powered water pumping solution for areas where it is not possible to connect to the electricity supply. Electricity is generated using photovoltaic panels to power a dedicated drive directly. The system operates without batteries, the purpose being to provide a continuous supply of water by ensuring the tank is sized correctly according to requirements and the daily amounts of sunlight.

To facilitate use for teaching purposes, this model can be powered by a PV array with 300 VDC output, by a 24 VDC laboratory power supply, or via the AC main power supply.

Benefits
- Compact equipment
- Challenges of water extraction illustrated by real-life cases
- Stand-alone operation possible

To order
MD3BP ODS
SOLAR WATER extraction bench
BipBop offer
Traffic lights and lift

Learning objectives
- To analyze a timing diagram and transpose it into a Ladder diagram
- To translate a Ladder and FBD diagram
- To analyze a timing diagram and transpose it into a GRAFCET diagram
- To study the following control system functions:
  - time delay
  - counting
  - memory
  - conditional actions

Presentation
This offer comprises two separate cabinets. The traffic light cabinet is used to study the control system for a set of traffic lights at a crossroads with a pedestrian crossing. There are two operating modes: a 3-colour traffic signal and a flashing signal. The lift cabinet is used to study the control system for a 4-level lift. The lift car position is displayed by red indicators and door opening/closing is indicated by LEDs. Call buttons at each landing level and in the lift car are used to call the lift to go up or down.

Description
The traffic light cabinet includes:
- 1 x 24 VDC supply
- 1 Zelio PLC
- 1 pedestrian crossing call button
The lift cabinet includes:
- 1 x 24 VDC supply
- 1 M221 PLC
- 1 mimic panel with LEDs and indicators
- Control buttons

Main industries
- Electrotechnical engineering
- Industrial maintenance

Characteristics
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>230 V/10 VA</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>290 x 340 x 140 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>3 kg</td>
</tr>
</tbody>
</table>

Benefits
- Compact equipment
- Low-cost solution

To order
- MD3BPXROAD BipBop traffic light cabinet
- MD3BPLIFT BipBop lift cabinet
Services
Chapter 6
Services

E-learning ................................................................. page 198
System modernization offer ........................................ page 199
On-site commissioning ................................................ page 200
EV charging station .................................................... page 201
Top-up courses .......................................................... page 202
Learning space on the website ........................................ page 203
Dedicated Education contacts ........................................ page 204
E-learning
E-Learning

Learning objectives
- To develop a learning path for the student
- To integrate the necessary resources for completing practical exercises
- To set up one-to-one sessions to discuss results
- To assess progress by means of a mark (overall or interim percentage)
- To allow completion of work outside of school hours

Main industries
- All disciplines

Presentation
The E-learning offer provides the option to complete practical exercises in a digital format rather than on paper, as well as to follow a programme of topic-based training sessions linked up to the teaching equipment. The E-learning programme offers a more personalized approach to learning by making resources available for use by students. The main advantages of this approach are that it avoids delays in practical exercises and periods of inactivity when teachers are involved with other groups. Teachers also have greater availability in terms of monitoring student progress.

Description
- Integration of practical exercises on digital media
- Integration of topic-based training modules
- Modules (practical exercises and training sessions) distributed via an LMS platform

Benefits
- Individual programme for completing practical exercises
- Optimum conditions for students to succeed
- Learning evaluation questionnaire

To order
Training Offer integrated in all our models
System modernization offer

Learning objectives
- To coordinate teachers for work to be carried out over a number of years depending on the complexity of the machine and/or the installed base to be retrofitted
- To manage a schedule
- To manage orders for equipment
- To program PLCs, display units, drives, etc.
- To carry out project monitoring in a real-life situation
- To commission the equipment
- To carry out wiring tasks with students
- To perform tasks led by students

Main industries
- Maintenance
- Electrotechnical

Presentation
We have a sizable installed base of training equipment in schools and colleges, much of which is outdated. We are now offering a modernization service which is designed to:
- Offer a low-cost means of retrofitting machines
- Integrate the latest technical developments
- Harmonize equipment for students in different disciplines (maintenance and electrotechnical engineering) with different qualification levels

Description
- Equipment provided at reduced cost
- Advice and expertise from Schneider Electric at the pre-project stage
- Schneider Electric support throughout the project
- Training on software and equipment for the teachers at the schools/colleges participating in the project

Benefits
- Low-cost means of retrofitting the installed base
- Harmonized equipment for different disciplines
- Suitable topic for electrotechnical engineering projects

To order
UEHGMODMAC | Machine modernization
Please contact us to define the offer

Retrofit plate for teaching system equipment

DOL starter
Soft starter
Selection of the type of starter
24 VDC power supplies
KA1
IC
TG adaptation
On-site commissioning

Presentation
We offer an on-site commissioning service to help you get your new Schneider Electric teaching equipment up and running as quickly and smoothly as possible. This offer includes a half-day group training session by one of our specialists or partners.

Conformity check
In addition to the manufacturer’s certificate supplied with our equipment, we offer an on-site machine conformity check at your premises.

Communication between LV switchboard and equipment
We offer the following services to help you set up your training equipment to communicate with the Schneider Electric teaching LV switchboard:
- Integration of requirements into existing systems
- Development and modification of PLC programs and display units
- On-site program installation, installation testing and commissioning

Your Schneider Electric Education contact will help you define a specification tailored to your needs.

Note
- Installation of the necessary plumbing and electrical connections must be organized by the school/college prior to commissioning.
- The service offer references below are only available in mainland France.

Benefits
- Involvement from the manufacturer
- Customized support
- Get to grips with your new equipment more quickly

To order

<table>
<thead>
<tr>
<th>Reference</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD1SMIF</td>
<td>Commissioning + group training</td>
</tr>
<tr>
<td>MD1SCTL</td>
<td>On-site conformity check</td>
</tr>
</tbody>
</table>

To set up communication between LV switchboard and teaching equipment: please contact us.
Services

Electric vehicle charging station

Presentation

This EV charging station consists of a photovoltaic shelter providing parking for 2 cars with an EV charging station equipped with 2 T3 connectors:
● The electricity generated by the PV panels is distributed to the nearest building.
● The charging station is powered via the AC power supply.

The charging station is is part of a campaign to encourage electric mobility and sustainable development: it allows both staff and visitors to charge their electric or hybrid vehicles at the school/college using “green” electricity. The aim is to balance annual PV electricity generation and EV consumption.

The station is assembled and connected to the AC power supply by Schneider Electric. A preliminary site visit is necessary to assess the site configuration and connection distances.

It is also possible to have PV electricity generation and EV charging data sent to a supervisory program or a web page (available as an option).

Description

● 1 x 25 m² shelter
● 1 x 3 kVA single-phase protection cabinet with Schneider Electric CONEXT inverter
● 1 Schneider Electric EVlink charging station with 2 T3 3kW or 7kW single-phase connectors (T2 connector option also)

Available as an option
● Supervision of PV generation and EV charging on PC
● Customized web pages
● Outdoor 46” display screen under the shelter
● Real-time display of solar power generated
● Wi-Fi hotspot on the charging station

Benefits

● Turnkey installation, showcase for the school/college
● Equipment can be dismantled and does not require planning permission
● No need for EDF subscription

To order

UEHGSTPVBC2P  EV charging station with 2 parking spaces + PV shelter

For options and different station variants: please contact us
Top-up courses

Schneider Electric runs training courses and technical days for trainers in connection with academic training programmes.

For teachers in the public sector, registration is via the CERPEP website:
https://eduscol.education.fr/pid31532/stages-cerpep-de-formation-en-milieu-professionnel.html

For teachers in the private sector, registration details can be found on the CTPN website:
http://www.ctpn.asso.fr/stages.php3/

Examples of SERPEP courses available

- **UNITY** Getting started and programming in UNITY: 4 days
- **SysML** modelling and programming in UNITY: 4 days
- **RT2012** Energy efficiency and PV technology: 5 days
- **SoMachine** programming in SoMachine: 4 days
- **Industrial LANs** Ethernet, Modbus, CANopen: 4 days
- **KNX certification** KNX programming with ETS5: 5 days
- **Advanced KNX application** 3 days
- **Energy and sustainable development challenges** 1 day
- **PSR and H&S** psycho-social risks and health and safety in the workplace: 1 day
- **Fibre optics** (by region): 1 day

Technical Days: contact your Schneider Electric Education representative to arrange

- **JTECO** energy efficiency in electrical installations
- **JTBECO** energy efficiency in buildings
- **JTDET** industrial detection
- **JTFDM** motor starters
- **JTVV** variable speed control
- **JTRT2012** applying the requirements of the RT2012 energy efficiency standard
- **JTCER** reactive power factor correction
- **JTFDR** lightning protection
- **JTBTCOM** communicating switchboards
- **JTFO** fibre optics
Services

Learning space on the website

The Schneider Electric website contains all you need to know about our education offer:

https://www.schneider-electric.fr/sites/France/fr/produits-services/enseignement/offre-pedagogique.page

From this page you can access:

- the education programme offer including details of the equipment
- the different catalogues for the education offer
- up-to-date news about Schneider Electric's educational initiatives
- Energy City, a tool to help explain various professions in the electricity sector
- a link to the Schneider Electric careers page

Energy University


Supplement your learning with some 180 free training modules available in English to help you improve your knowledge of Data Centres and energy efficiency. You can also select modules in French on energy efficiency, smart grids, energy audits, HVAC, lighting, etc.
Your Schneider Electric Education contacts

**Jean-Pierre Noël**
Education Service Provision and Sales VP
jean-pierre.noel@schneider-electric.com

**Morad Benmaiza** - +33 (0)6 83 83 96 49
morad.benmaiza@schneider-electric.com
AC: Aix-Marseille/Nice-Corsica/Grenoble/Lyon

**Pascal Filloque** - +33 (0)6 83 83 99 71
pascal.filloque@schneider-electric.com
AC: Amiens/Rouen/Lille/Caen

**Thierry Chadufaux** - +33 (0)6 87 73 07 82
thierry.chadufaux@schneider-electric.com
AC: Rennes/Orléans-Tours/Nantes

**Gilles Kerger** - +33 (0)6 87 72 85 00
gilles.kerger@schneider-electric.com
AC: Dijon/Besançon/Strasbourg/Nancy-Metz/Reims

**Morad Benmaiza** - +33 (0)6 83 83 96 49
morad.benmaiza@schneider-electric.com
AC: Aix-Marseille/Nice-Corsica/Grenoble/Lyon

**Gilles Kerger** - +33 (0)6 87 72 85 00
gilles.kerger@schneider-electric.com
AC: Dijon/Besançon/Strasbourg/Nancy-Metz/Reims

**Jean-Pierre Noël**
Education Service Provision and Sales VP
jean-pierre.noel@schneider-electric.com

**Morad Benmaiza** - +33 (0)6 83 83 96 49
morad.benmaiza@schneider-electric.com
AC: Aix-Marseille/Nice-Corsica/Grenoble/Lyon

**Pascal Filloque** - +33 (0)6 83 83 99 71
pascal.filloque@schneider-electric.com
AC: Amiens/Rouen/Lille/Caen

**Thierry Chadufaux** - +33 (0)6 87 73 07 82
thierry.chadufaux@schneider-electric.com
AC: Rennes/Orléans-Tours/Nantes

**Jean-Marc Gonzales** - +33 (0)6 83 83 73 32
jean-marc.gonzales@schneider-electric.com
AC: Bordeaux/Limoges/Poitiers/Toulouse/Montpellier

**Yasser Redjeb** - +33 (0)6 32 04 76 28
yasser.redjeb@schneider-electric.com
AC: Aix-Marseille/Nice-Corsica/Grenoble/Lyon/Clermont-Ferrand

**Administrative contact**
Thierry PORCHERON
+33 (0)1 41 39 37 39
thierry.porcheron@schneider-electric.com
AC: Créteil/Paris/Versailles/Dijon/Besançon/Strasbourg/Nancy-Metz/Reims/Rennes/Orléans-Tours/Nantes

**Administrative contact**
Danielle DEFAY
+33 (0)4 37 60 23 87
danielle.defay@schneider-electric.com
AC: Amiens/Rouen/Caen/Lille/Bordeaux/Limoges/Poitiers/Toulouse/Montpellier/Aix-Marseille/Nice-Corsica/Grenoble/Lyon
<table>
<thead>
<tr>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 brushless axis training bench</td>
<td>165</td>
</tr>
<tr>
<td>1 digital axis training bench</td>
<td>163</td>
</tr>
<tr>
<td>19” VDI pack</td>
<td>82</td>
</tr>
<tr>
<td>3D operative parts of industrial machines</td>
<td>158</td>
</tr>
<tr>
<td>5-movement joystick</td>
<td>167</td>
</tr>
<tr>
<td>Accreditation cases</td>
<td>8</td>
</tr>
<tr>
<td>Accreditation system</td>
<td>10</td>
</tr>
<tr>
<td>Accreditation test bench</td>
<td>9</td>
</tr>
<tr>
<td>Additional case for BS accreditation</td>
<td>11</td>
</tr>
<tr>
<td>Addressable emergency lighting pack</td>
<td>14</td>
</tr>
<tr>
<td>Addressable fire safety bench</td>
<td>15</td>
</tr>
<tr>
<td>Addressable stand-alone emergency lighting unit case</td>
<td>13</td>
</tr>
<tr>
<td>Air handling unit</td>
<td>90</td>
</tr>
<tr>
<td>Air/air heat pump bench</td>
<td>92</td>
</tr>
<tr>
<td>ALTIVAR 32 case</td>
<td>125</td>
</tr>
<tr>
<td>Analog sensors and process control</td>
<td>115</td>
</tr>
<tr>
<td>Assembly line</td>
<td>177</td>
</tr>
<tr>
<td>Automated drilling system</td>
<td>169</td>
</tr>
<tr>
<td>Automatic part sorting subsystem</td>
<td>168</td>
</tr>
<tr>
<td>Automation &amp; industrial communication</td>
<td>134</td>
</tr>
<tr>
<td>Automation modular offer</td>
<td>145</td>
</tr>
<tr>
<td>Automation operative part modular offer</td>
<td>146</td>
</tr>
<tr>
<td>Automation software packs reserved for teaching</td>
<td>136</td>
</tr>
<tr>
<td>BipBop Programme</td>
<td>188</td>
</tr>
<tr>
<td>Brushless training case</td>
<td>129</td>
</tr>
<tr>
<td>Building communication</td>
<td>74</td>
</tr>
<tr>
<td>Building energy management 3D cubicles</td>
<td>69</td>
</tr>
<tr>
<td>Building energy telemetry modular offer</td>
<td>70</td>
</tr>
<tr>
<td>Building management</td>
<td>60</td>
</tr>
<tr>
<td>Cabinets for upgrading LV switchboards to energy management switchboards</td>
<td>27</td>
</tr>
<tr>
<td>Cabling bench of industrial components</td>
<td>109</td>
</tr>
<tr>
<td>CAP (vocational training certificate) main switchboard</td>
<td>23</td>
</tr>
<tr>
<td>CI/PRO KNX modular offer</td>
<td>65</td>
</tr>
<tr>
<td>Communication case</td>
<td>154</td>
</tr>
<tr>
<td>Communication case for teaching</td>
<td>155</td>
</tr>
<tr>
<td>Containment cabinet</td>
<td>108</td>
</tr>
<tr>
<td>Distribution</td>
<td>20</td>
</tr>
<tr>
<td>Domestic cabinet</td>
<td>190</td>
</tr>
<tr>
<td>Earthing systems and discrimination cabinet</td>
<td>193</td>
</tr>
<tr>
<td>Earthing systems bench</td>
<td>30</td>
</tr>
<tr>
<td>Educational motors</td>
<td>112</td>
</tr>
<tr>
<td>E-learning</td>
<td>198</td>
</tr>
<tr>
<td>Electric vehicle charging station</td>
<td>201</td>
</tr>
<tr>
<td>Electric vehicles</td>
<td>52</td>
</tr>
<tr>
<td>Electrical distribution software</td>
<td>72</td>
</tr>
<tr>
<td>Learning space on the website</td>
<td>203</td>
</tr>
<tr>
<td>Level control training bench</td>
<td>164</td>
</tr>
<tr>
<td>Linear axis packs</td>
<td>123</td>
</tr>
<tr>
<td>Load testing bench with asynchronous motors</td>
<td>126</td>
</tr>
<tr>
<td>Electrical hazards awareness cabinet</td>
<td>191</td>
</tr>
<tr>
<td>Electromagnetic interference</td>
<td>35</td>
</tr>
<tr>
<td>Electronic starter packs</td>
<td>120</td>
</tr>
<tr>
<td>Energy efficiency</td>
<td>84</td>
</tr>
<tr>
<td>Energy efficiency enclosure</td>
<td>71</td>
</tr>
<tr>
<td>Energy efficiency KNX modular offer</td>
<td>99</td>
</tr>
<tr>
<td>Energy efficiency Mod KNX offer</td>
<td>66</td>
</tr>
<tr>
<td>Energy management 3D cubicule</td>
<td>100</td>
</tr>
<tr>
<td>Energy management in the home</td>
<td>101</td>
</tr>
<tr>
<td>Energy management in the home according to RT2012</td>
<td>102</td>
</tr>
<tr>
<td>Energy management LV switchboard</td>
<td>25</td>
</tr>
<tr>
<td>EV charging station (automotive disciplines)</td>
<td>56</td>
</tr>
<tr>
<td>EV charging station adapted for training purposes</td>
<td>54</td>
</tr>
<tr>
<td>Fibre optic accessories</td>
<td>80</td>
</tr>
<tr>
<td>Fibre optic training bench</td>
<td>78</td>
</tr>
<tr>
<td>Flexible dosing line</td>
<td>174</td>
</tr>
<tr>
<td>FTTH fibre optic packs</td>
<td>76</td>
</tr>
<tr>
<td>Greenhouse management system</td>
<td>86</td>
</tr>
<tr>
<td>Harmonic interference</td>
<td>36 &amp; 37</td>
</tr>
<tr>
<td>HARMOTRIS - MINHARMOTRIS</td>
<td></td>
</tr>
<tr>
<td>Heating control bench</td>
<td>91</td>
</tr>
<tr>
<td>HMI mobile cabinet</td>
<td>148</td>
</tr>
<tr>
<td>HMI packs</td>
<td>147</td>
</tr>
<tr>
<td>Hoisting bench with vector control</td>
<td>131</td>
</tr>
<tr>
<td>Home IO plus interface software</td>
<td>67</td>
</tr>
<tr>
<td>Hydroelectric power bench</td>
<td>50</td>
</tr>
<tr>
<td>Industrial communication modular offer</td>
<td>152</td>
</tr>
<tr>
<td>Industrial communication on pre-wired grid</td>
<td>153</td>
</tr>
<tr>
<td>Industrial control</td>
<td>106</td>
</tr>
<tr>
<td>Industrial packaging machine</td>
<td>172</td>
</tr>
<tr>
<td>Industrial PLC packs</td>
<td>141</td>
</tr>
<tr>
<td>Industrial sensors</td>
<td>114</td>
</tr>
<tr>
<td>Installing an EV charging station</td>
<td>55</td>
</tr>
<tr>
<td>Integrated production system</td>
<td>173</td>
</tr>
<tr>
<td>Introduction to programmed logic</td>
<td>142</td>
</tr>
<tr>
<td>IT system cabinet and secondary distribution boards</td>
<td>28</td>
</tr>
<tr>
<td>IT system enclosure for hospital environment</td>
<td>29</td>
</tr>
<tr>
<td>KNX case</td>
<td>62</td>
</tr>
<tr>
<td>KNX mini building</td>
<td>64</td>
</tr>
<tr>
<td>KNX packs</td>
<td>68</td>
</tr>
<tr>
<td>KNX panels</td>
<td>63</td>
</tr>
<tr>
<td>LAN-FTTO fibre optic packs</td>
<td>77</td>
</tr>
<tr>
<td>Learning space on the website</td>
<td></td>
</tr>
<tr>
<td>Lighting and heating cabinets for RT2012 compliance</td>
<td>26</td>
</tr>
<tr>
<td>Load testing bench with asynchronous motors</td>
<td></td>
</tr>
<tr>
<td>Schneider Electric</td>
<td></td>
</tr>
<tr>
<td>Reference</td>
<td>Page</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>LV switchboard for vocational training</td>
<td>24</td>
</tr>
<tr>
<td>Machine PLC packs</td>
<td>138</td>
</tr>
<tr>
<td>Machine safety modular offer</td>
<td>16</td>
</tr>
<tr>
<td>Medium voltage cubicles</td>
<td>22</td>
</tr>
<tr>
<td>Micro solar power plant ✡</td>
<td>44</td>
</tr>
<tr>
<td>Mini-hoisting bench with cable winch</td>
<td>130</td>
</tr>
<tr>
<td>Mock-up for introduction to the lift automation system</td>
<td>160</td>
</tr>
<tr>
<td>Mock-up for introduction to the surface treatment system control system</td>
<td>161</td>
</tr>
<tr>
<td>Mock-up for introduction to the traffic management system</td>
<td>159</td>
</tr>
<tr>
<td>Motor starter bench</td>
<td>113</td>
</tr>
<tr>
<td>Motor starter cabinet ✡</td>
<td>189</td>
</tr>
<tr>
<td>Motor starter modular offer</td>
<td>111</td>
</tr>
<tr>
<td>Motor starter packs</td>
<td>110</td>
</tr>
<tr>
<td>On-site commission</td>
<td>200</td>
</tr>
<tr>
<td>Operative parts for renewable energy bench ✡</td>
<td>42</td>
</tr>
<tr>
<td>Packaging line ✡</td>
<td>175</td>
</tr>
<tr>
<td>Panel-mounted training PLCs</td>
<td>143</td>
</tr>
<tr>
<td>Parcel sorting system</td>
<td>170</td>
</tr>
<tr>
<td>Photovoltaic characterization bench ✡</td>
<td>46</td>
</tr>
<tr>
<td>PLC and display unit on control desk</td>
<td>144</td>
</tr>
<tr>
<td>PLC introductory packs</td>
<td>137</td>
</tr>
<tr>
<td>Pneumatic and electro-pneumatic panels</td>
<td>117</td>
</tr>
<tr>
<td>Pneumatic joystick with rotary actuator</td>
<td>166</td>
</tr>
<tr>
<td>Power quality</td>
<td>32</td>
</tr>
<tr>
<td>Product index</td>
<td>205</td>
</tr>
<tr>
<td>Protection discrimination bench</td>
<td>31</td>
</tr>
<tr>
<td>PV-wind turbine system for remote sites</td>
<td>45</td>
</tr>
<tr>
<td>Reactive power factor correction</td>
<td>34</td>
</tr>
<tr>
<td>Reactive power factor correction cabinet ✡</td>
<td>192</td>
</tr>
<tr>
<td>Reference index</td>
<td>207</td>
</tr>
<tr>
<td>Renewable energy</td>
<td>38</td>
</tr>
<tr>
<td>Renewable energy generation ✡</td>
<td>41</td>
</tr>
<tr>
<td>Residential</td>
<td>94</td>
</tr>
<tr>
<td>Residential and small business equipment pack</td>
<td>97</td>
</tr>
<tr>
<td>Residential modular offer</td>
<td>98</td>
</tr>
<tr>
<td>Residential VDI LEXHOME case</td>
<td>96</td>
</tr>
<tr>
<td>RFID card game modular offer</td>
<td>150</td>
</tr>
<tr>
<td>RFID case</td>
<td>151</td>
</tr>
<tr>
<td>RFID pack</td>
<td>149</td>
</tr>
<tr>
<td>Safety awareness case</td>
<td>12</td>
</tr>
<tr>
<td>Servo motor packs</td>
<td>122</td>
</tr>
<tr>
<td>Solar potential ✡</td>
<td>43</td>
</tr>
<tr>
<td>Solar power modular offer</td>
<td>40</td>
</tr>
<tr>
<td>Solar water heating system</td>
<td>49</td>
</tr>
<tr>
<td>Solar-powered water extraction ✡</td>
<td>47</td>
</tr>
<tr>
<td>Solar-powered water extraction ✡</td>
<td>194</td>
</tr>
<tr>
<td>Stage lighting gantry</td>
<td>171</td>
</tr>
<tr>
<td>System modernization offer</td>
<td>199</td>
</tr>
<tr>
<td>Systems and subsystems</td>
<td>156</td>
</tr>
<tr>
<td>Top-up courses</td>
<td>202</td>
</tr>
<tr>
<td>Traffic lights and lift ✡</td>
<td>195</td>
</tr>
<tr>
<td>Training contacts</td>
<td>204</td>
</tr>
<tr>
<td>Tube solar water heater</td>
<td>48</td>
</tr>
<tr>
<td>Twin-flow ventilation bench ✡</td>
<td>93</td>
</tr>
<tr>
<td>Variable speed bench with motor</td>
<td>127</td>
</tr>
<tr>
<td>Variable speed bench with powder brake</td>
<td>128</td>
</tr>
<tr>
<td>Variable speed control &amp; motion control</td>
<td>118</td>
</tr>
<tr>
<td>Variable speed control packs</td>
<td>121</td>
</tr>
<tr>
<td>Variable speed drive training cabinets</td>
<td>124</td>
</tr>
<tr>
<td>Ventilation bench with variable speed control</td>
<td>89</td>
</tr>
<tr>
<td>Ventilation EE case</td>
<td>87</td>
</tr>
<tr>
<td>Ventilation EE modular offer</td>
<td>88</td>
</tr>
<tr>
<td>VIRTUAL UNIVERSE PRO 3D simulator ✡</td>
<td>184</td>
</tr>
<tr>
<td>Winch hoisting crane</td>
<td>133</td>
</tr>
<tr>
<td>Wireless industrial control</td>
<td>116</td>
</tr>
<tr>
<td>Wiring panel for intermediate certification</td>
<td>162</td>
</tr>
<tr>
<td>X and Z axis bench</td>
<td>132</td>
</tr>
<tr>
<td>Reference</td>
<td>Page</td>
</tr>
<tr>
<td>---------------</td>
<td>------</td>
</tr>
<tr>
<td>MD1AA200</td>
<td>109</td>
</tr>
<tr>
<td>MD1AA209</td>
<td>109</td>
</tr>
<tr>
<td>MD1AA31W03M2</td>
<td>124</td>
</tr>
<tr>
<td>MD1AA31W15N4</td>
<td>124</td>
</tr>
<tr>
<td>MD1AA400ML03M</td>
<td>130</td>
</tr>
<tr>
<td>MD1AA400ML03TAM</td>
<td>130</td>
</tr>
<tr>
<td>MD1AA400SL71CVM</td>
<td>131</td>
</tr>
<tr>
<td>MD1AA400SL71DM</td>
<td>131</td>
</tr>
<tr>
<td>MD1AA400SLT01CM</td>
<td>133</td>
</tr>
<tr>
<td>MD1AA400SLT01DM</td>
<td>133</td>
</tr>
<tr>
<td>MD1AA410AXZ01M</td>
<td>132</td>
</tr>
<tr>
<td>MD1AA410AZ02AM</td>
<td>132</td>
</tr>
<tr>
<td>MD1AA410AZ02BM</td>
<td>132</td>
</tr>
<tr>
<td>MD1AA500</td>
<td>114</td>
</tr>
<tr>
<td>MD1AA502</td>
<td>114</td>
</tr>
<tr>
<td>MD1AA509</td>
<td>114</td>
</tr>
<tr>
<td>MD1AA513</td>
<td>10</td>
</tr>
<tr>
<td>MD1AA514</td>
<td>10</td>
</tr>
<tr>
<td>MD1AA516</td>
<td>10</td>
</tr>
<tr>
<td>MD1AA516MR</td>
<td>10</td>
</tr>
<tr>
<td>MD1AA518</td>
<td>10</td>
</tr>
<tr>
<td>MD1AA529</td>
<td>112</td>
</tr>
<tr>
<td>MD1AA529LT</td>
<td>112</td>
</tr>
<tr>
<td>MD1AA540</td>
<td>113</td>
</tr>
<tr>
<td>MD1AA570</td>
<td>128</td>
</tr>
<tr>
<td>MD1AA580FP</td>
<td>127</td>
</tr>
<tr>
<td>MD1AA595</td>
<td>126</td>
</tr>
<tr>
<td>MD1AA620</td>
<td>115</td>
</tr>
<tr>
<td>MD1AA630</td>
<td>8</td>
</tr>
<tr>
<td>MD1AA638</td>
<td>11</td>
</tr>
<tr>
<td>MD1AA639</td>
<td>8</td>
</tr>
<tr>
<td>MD1AA639</td>
<td>9</td>
</tr>
<tr>
<td>MD1AA665CH</td>
<td>26</td>
</tr>
<tr>
<td>MD1AA665ECL</td>
<td>26</td>
</tr>
<tr>
<td>MD1AA665INT</td>
<td>27</td>
</tr>
<tr>
<td>MD1AA685</td>
<td>108</td>
</tr>
<tr>
<td>MD1AA700TDS</td>
<td>28</td>
</tr>
<tr>
<td>MD1AA700TDT</td>
<td>28</td>
</tr>
<tr>
<td>MD1AA700TT</td>
<td>28</td>
</tr>
<tr>
<td>MD1AA710</td>
<td>29</td>
</tr>
<tr>
<td>MD1AA719</td>
<td>29</td>
</tr>
<tr>
<td>MD1AA71W03M3</td>
<td>124</td>
</tr>
<tr>
<td>MD1AA71W15N4</td>
<td>124</td>
</tr>
<tr>
<td>MD1AA720</td>
<td>23</td>
</tr>
<tr>
<td>MD1AA720NC</td>
<td>23</td>
</tr>
<tr>
<td>MD1AA728</td>
<td>23</td>
</tr>
<tr>
<td>MDTA729</td>
<td>23</td>
</tr>
<tr>
<td>MD1AA740</td>
<td>110</td>
</tr>
<tr>
<td>Reference</td>
<td>Page</td>
</tr>
<tr>
<td>---------------</td>
<td>------</td>
</tr>
<tr>
<td>MD1AMLKNXPRO</td>
<td>65</td>
</tr>
<tr>
<td>MD1AMLKR</td>
<td>145</td>
</tr>
<tr>
<td>MD1AMLRFID</td>
<td>150</td>
</tr>
<tr>
<td>MD1AMLSECU</td>
<td>16</td>
</tr>
<tr>
<td>MD1AMLSSOL</td>
<td>40</td>
</tr>
<tr>
<td>MD1AMLTW</td>
<td>145</td>
</tr>
<tr>
<td>MD1AMLTW</td>
<td>145</td>
</tr>
<tr>
<td>MD1AMP001</td>
<td>111</td>
</tr>
<tr>
<td>MD1AMP001</td>
<td>112</td>
</tr>
<tr>
<td>MD1AMP001</td>
<td>191</td>
</tr>
<tr>
<td>MD1AMP002</td>
<td>146</td>
</tr>
<tr>
<td>MD1AMP003</td>
<td>146</td>
</tr>
<tr>
<td>MD1AMP005</td>
<td>146</td>
</tr>
<tr>
<td>MD1AMP006</td>
<td>146</td>
</tr>
<tr>
<td>MD1AMP008</td>
<td>146</td>
</tr>
<tr>
<td>MD1AMP010</td>
<td>63</td>
</tr>
<tr>
<td>MD1AMP011</td>
<td>16</td>
</tr>
<tr>
<td>MD1AMP013</td>
<td>111</td>
</tr>
<tr>
<td>MD1AMP013</td>
<td>112</td>
</tr>
<tr>
<td>MD1AMP013</td>
<td>146</td>
</tr>
<tr>
<td>MD1AMP014</td>
<td>189</td>
</tr>
<tr>
<td>MD1AMP024</td>
<td>146</td>
</tr>
<tr>
<td>MD1AP058LX</td>
<td>139</td>
</tr>
<tr>
<td>MD1AP21</td>
<td>137</td>
</tr>
<tr>
<td>MD1AP21C</td>
<td>137</td>
</tr>
<tr>
<td>MD1AP21P</td>
<td>137</td>
</tr>
<tr>
<td>MD1AP241STU</td>
<td>138</td>
</tr>
<tr>
<td>MD1AP258STU</td>
<td>138</td>
</tr>
<tr>
<td>MD1AP34ASI</td>
<td>141</td>
</tr>
<tr>
<td>MD1AP34M</td>
<td>141</td>
</tr>
<tr>
<td>MD1AP34ME</td>
<td>141</td>
</tr>
<tr>
<td>MD1AP34MEC</td>
<td>141</td>
</tr>
<tr>
<td>MD1AP34MN</td>
<td>141</td>
</tr>
<tr>
<td>MD1AP34R</td>
<td>141</td>
</tr>
<tr>
<td>MD1AP41A</td>
<td>138</td>
</tr>
<tr>
<td>MD1APATS01</td>
<td>120</td>
</tr>
<tr>
<td>MD1APATS22</td>
<td>120</td>
</tr>
<tr>
<td>MD1APATS48</td>
<td>120</td>
</tr>
<tr>
<td>MD1APATV12M</td>
<td>121</td>
</tr>
<tr>
<td>MD1APATV12T</td>
<td>121</td>
</tr>
<tr>
<td>MD1APATV312M</td>
<td>121</td>
</tr>
<tr>
<td>MD1APATV312T</td>
<td>121</td>
</tr>
<tr>
<td>MD1APATV32M</td>
<td>121</td>
</tr>
<tr>
<td>MD1APATV32T</td>
<td>121</td>
</tr>
<tr>
<td>MD1APATVM</td>
<td>121</td>
</tr>
<tr>
<td>MD1APATVT</td>
<td>121</td>
</tr>
<tr>
<td>MD1APCC</td>
<td>140</td>
</tr>
<tr>
<td>MD1APCE</td>
<td>140</td>
</tr>
<tr>
<td>MD1APCM</td>
<td>140</td>
</tr>
<tr>
<td>MD1APESADR</td>
<td>14</td>
</tr>
<tr>
<td>MD1APESERT</td>
<td>14</td>
</tr>
<tr>
<td>MD1APHM07V2</td>
<td>147</td>
</tr>
<tr>
<td>MD1APHM10V2</td>
<td>147</td>
</tr>
<tr>
<td>MD1APHM655</td>
<td>147</td>
</tr>
<tr>
<td>MD1APHM855</td>
<td>147</td>
</tr>
<tr>
<td>MD1APHMISCU</td>
<td>139</td>
</tr>
<tr>
<td>MD1APHMISCUC</td>
<td>147</td>
</tr>
<tr>
<td>MD1APLX32M</td>
<td>122</td>
</tr>
<tr>
<td>MD1APLX32T</td>
<td>122</td>
</tr>
<tr>
<td>MD1APMT32MAX2</td>
<td>123</td>
</tr>
<tr>
<td>MD1APMT32PAS</td>
<td>123</td>
</tr>
<tr>
<td>MD1APMTATV32</td>
<td>123</td>
</tr>
<tr>
<td>MD1APMTLX32</td>
<td>122</td>
</tr>
<tr>
<td>MD1APMTLXI</td>
<td>122</td>
</tr>
<tr>
<td>MD1APMTMAX2</td>
<td>123</td>
</tr>
<tr>
<td>MD1APMTPAR</td>
<td>123</td>
</tr>
<tr>
<td>MD1APPFCSV</td>
<td>139</td>
</tr>
<tr>
<td>MD1APPFRFID</td>
<td>139</td>
</tr>
<tr>
<td>MD1APTW</td>
<td>137</td>
</tr>
<tr>
<td>MD1ATVEE</td>
<td>87</td>
</tr>
<tr>
<td>MD1AVKNX</td>
<td>62</td>
</tr>
<tr>
<td>MD1BPODS</td>
<td>47</td>
</tr>
<tr>
<td>MD1ERMSF</td>
<td>90</td>
</tr>
<tr>
<td>MD1ERMWH00</td>
<td>90</td>
</tr>
<tr>
<td>MD1ERMWM00</td>
<td>90</td>
</tr>
<tr>
<td>MD1ERMWM01</td>
<td>90</td>
</tr>
<tr>
<td>MD1ERMWM02</td>
<td>90</td>
</tr>
<tr>
<td>MD1ERMWT00</td>
<td>90</td>
</tr>
<tr>
<td>MD1ERMWT01</td>
<td>90</td>
</tr>
<tr>
<td>MD1ERMWT02</td>
<td>90</td>
</tr>
<tr>
<td>MD1ERMWT05</td>
<td>90</td>
</tr>
<tr>
<td>MD1FARD</td>
<td>172</td>
</tr>
<tr>
<td>MD1HYDCPCTEDF</td>
<td>50</td>
</tr>
<tr>
<td>MD1HYDFORM</td>
<td>50</td>
</tr>
<tr>
<td>MD1HYDROM340</td>
<td>50</td>
</tr>
<tr>
<td>MD1HYDROTW</td>
<td>50</td>
</tr>
<tr>
<td>MD1HYDSPV25</td>
<td>50</td>
</tr>
<tr>
<td>MD1PACKRFID</td>
<td>149</td>
</tr>
<tr>
<td>MD1PMXTSX</td>
<td>117</td>
</tr>
<tr>
<td>MD1PMXZTW</td>
<td>117</td>
</tr>
<tr>
<td>MD1S3DM221APF</td>
<td>158</td>
</tr>
<tr>
<td>MD1S3DM340APF</td>
<td>158</td>
</tr>
<tr>
<td>MD1S3DM340BF</td>
<td>158</td>
</tr>
<tr>
<td>MD1SCTL</td>
<td>200</td>
</tr>
<tr>
<td>MD1SMIF</td>
<td>200</td>
</tr>
<tr>
<td>MD1VSE1F</td>
<td>12</td>
</tr>
<tr>
<td>MD1ZELIO</td>
<td>142</td>
</tr>
<tr>
<td>MD1ZELIOB</td>
<td>142</td>
</tr>
<tr>
<td>MD2ATV32FA</td>
<td>125</td>
</tr>
<tr>
<td>MD2ATV32FS</td>
<td>125</td>
</tr>
<tr>
<td>MD3BCPER</td>
<td>192</td>
</tr>
<tr>
<td>MD3BPDMD</td>
<td>189</td>
</tr>
<tr>
<td>MD3BPDOM</td>
<td>190</td>
</tr>
<tr>
<td>MD3BLIFT</td>
<td>195</td>
</tr>
<tr>
<td>MD3BPODS</td>
<td>194</td>
</tr>
<tr>
<td>MD3BPSLT</td>
<td>193</td>
</tr>
<tr>
<td>MD3BPSRE</td>
<td>191</td>
</tr>
<tr>
<td>MD3BPXRoad</td>
<td>195</td>
</tr>
<tr>
<td>MD3MCPV</td>
<td>44</td>
</tr>
<tr>
<td>MDG999098H</td>
<td>35</td>
</tr>
<tr>
<td>MDG999099H</td>
<td>36</td>
</tr>
<tr>
<td>MDG999099H</td>
<td>37</td>
</tr>
<tr>
<td>MDG999120</td>
<td>97</td>
</tr>
<tr>
<td>MDG99130A</td>
<td>15</td>
</tr>
<tr>
<td>MDG99140</td>
<td>71</td>
</tr>
<tr>
<td>MDG99150</td>
<td>35</td>
</tr>
<tr>
<td>MDG99158</td>
<td>35</td>
</tr>
<tr>
<td>MDG99159</td>
<td>35</td>
</tr>
<tr>
<td>MDG99159</td>
<td>36</td>
</tr>
<tr>
<td>MDG99160</td>
<td>34</td>
</tr>
<tr>
<td>MDG99169</td>
<td>34</td>
</tr>
<tr>
<td>MDG99190</td>
<td>36</td>
</tr>
<tr>
<td>MDG99195</td>
<td>37</td>
</tr>
<tr>
<td>MDG99198</td>
<td>35</td>
</tr>
<tr>
<td>MDG99198</td>
<td>36</td>
</tr>
<tr>
<td>MDG99199</td>
<td>37</td>
</tr>
<tr>
<td>MDG99215</td>
<td>45</td>
</tr>
<tr>
<td>MDG993EBMB</td>
<td>64</td>
</tr>
<tr>
<td>MDG99400</td>
<td>41</td>
</tr>
<tr>
<td>MDG99401</td>
<td>41</td>
</tr>
<tr>
<td>MDG99402</td>
<td>41</td>
</tr>
<tr>
<td>MDG99403</td>
<td>41</td>
</tr>
<tr>
<td>MDG99410</td>
<td>42</td>
</tr>
<tr>
<td>MDG99420</td>
<td>42</td>
</tr>
<tr>
<td>MDG99430</td>
<td>42</td>
</tr>
<tr>
<td>MDG99440</td>
<td>42</td>
</tr>
<tr>
<td>MDG99603</td>
<td>30</td>
</tr>
<tr>
<td>MDG99605</td>
<td>30</td>
</tr>
<tr>
<td>MDG99609</td>
<td>30</td>
</tr>
<tr>
<td>MDG99610</td>
<td>31</td>
</tr>
<tr>
<td>MDG99WISER</td>
<td>101</td>
</tr>
<tr>
<td>MDGAGSANE</td>
<td>46</td>
</tr>
<tr>
<td>MDGAGSLE</td>
<td>43</td>
</tr>
<tr>
<td>MDGAGSTRK</td>
<td>46</td>
</tr>
<tr>
<td>MDGAGSVAL</td>
<td>43</td>
</tr>
<tr>
<td>MDGVAES</td>
<td>13</td>
</tr>
<tr>
<td>MDGVAECPCK</td>
<td>14</td>
</tr>
<tr>
<td>MDGDOMKXNECA</td>
<td>63</td>
</tr>
<tr>
<td>MDGDOMKXNSV</td>
<td>63</td>
</tr>
<tr>
<td>MDGIROCC</td>
<td>27</td>
</tr>
<tr>
<td>MDGIROCE</td>
<td>27</td>
</tr>
<tr>
<td>MDGMCVP</td>
<td>44</td>
</tr>
<tr>
<td>MDGVBAES</td>
<td>13</td>
</tr>
<tr>
<td>MDGVE010MVA</td>
<td>56</td>
</tr>
<tr>
<td>MDGVE050</td>
<td>55</td>
</tr>
<tr>
<td>MDGVE050CH</td>
<td>55</td>
</tr>
<tr>
<td>MDGVE050SIM</td>
<td>55</td>
</tr>
<tr>
<td>MDGVE050SIMV</td>
<td>55</td>
</tr>
<tr>
<td>MDGVE100</td>
<td>54</td>
</tr>
<tr>
<td>MDGVE100BM</td>
<td>54</td>
</tr>
<tr>
<td>MDGWISERCH</td>
<td>102</td>
</tr>
<tr>
<td>MDGWISECHF</td>
<td>102</td>
</tr>
<tr>
<td>MDGWISERTPR</td>
<td>102</td>
</tr>
<tr>
<td>MDSIMUIRA100</td>
<td>184</td>
</tr>
<tr>
<td>MDSIMUIRA200</td>
<td>184</td>
</tr>
<tr>
<td>MDSIMUIRA300</td>
<td>184</td>
</tr>
<tr>
<td>MDSIMUIRA200</td>
<td>184</td>
</tr>
<tr>
<td>UEHG BARQUETTE</td>
<td>176</td>
</tr>
<tr>
<td>UEHG FOURREAU</td>
<td>175</td>
</tr>
<tr>
<td>UEHGCOFINTE</td>
<td>171</td>
</tr>
<tr>
<td>UEHGHTA</td>
<td>22</td>
</tr>
<tr>
<td>UEHGHTR</td>
<td>22</td>
</tr>
<tr>
<td>UEHGINJ</td>
<td>22</td>
</tr>
<tr>
<td>UEHGJSL</td>
<td>171</td>
</tr>
<tr>
<td>UEHGLFDOS</td>
<td>174</td>
</tr>
<tr>
<td>UEHGLFDOSIMP</td>
<td>174</td>
</tr>
<tr>
<td>UEHGMODMAC</td>
<td>199</td>
</tr>
<tr>
<td>UEHGHSHR</td>
<td>100</td>
</tr>
<tr>
<td>UEHGSHNT</td>
<td>69</td>
</tr>
<tr>
<td>UEHGSTPBVC2P</td>
<td>201</td>
</tr>
<tr>
<td>VJEDDUSTU855</td>
<td>136</td>
</tr>
</tbody>
</table>
> Contact us!

Customer Contact Centre

Call this number to speak to a member of our dedicated sales team. Lines are open 8 am to 6 pm, Monday to Friday, all year round.