Flex Interfaces

Moulded-case and air circuit-breakers operating and control interface

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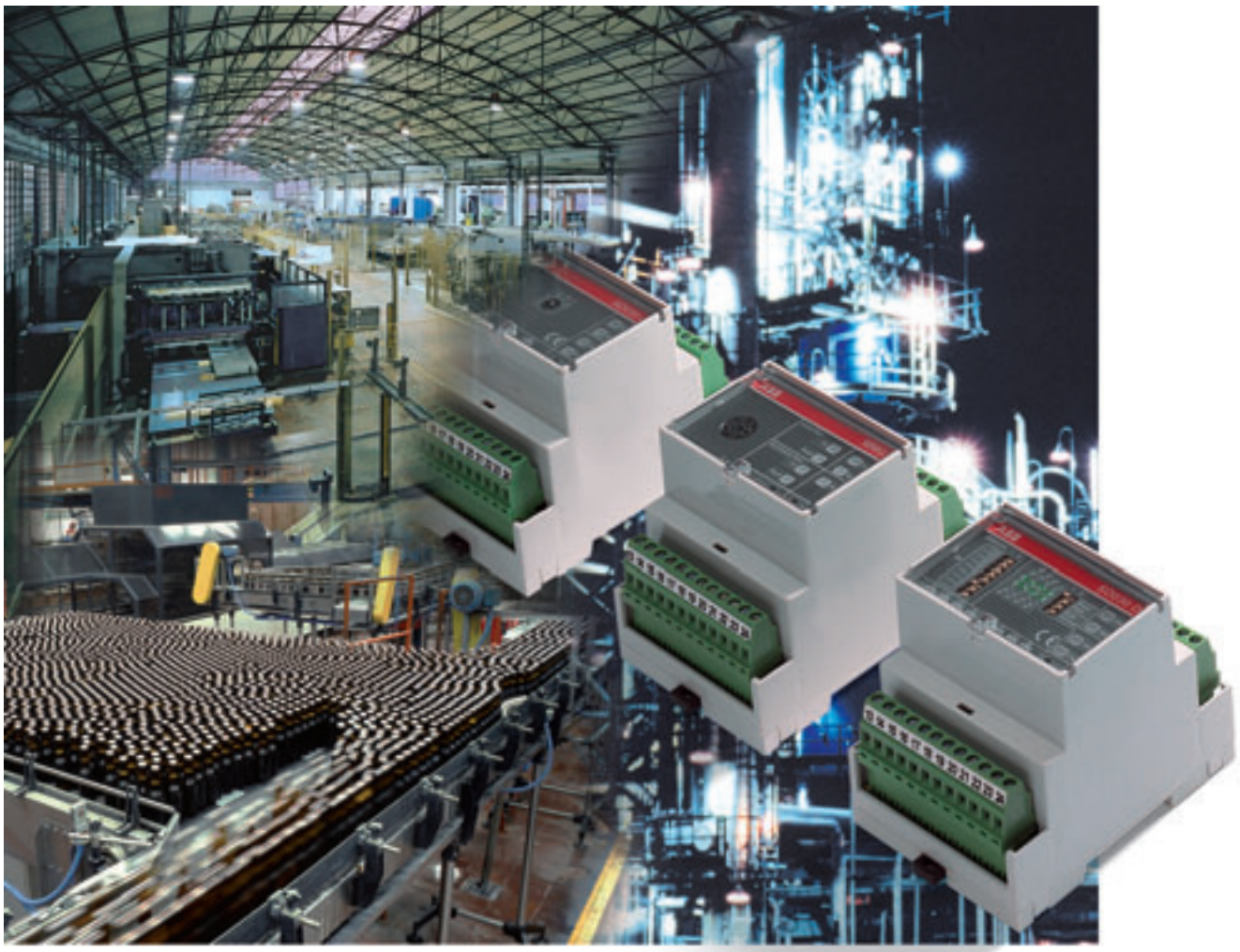

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ABB SACE Flex Interfaces are electronic devices for DIN rails, thought up for signalling and transmitting information between circuit-breakers and other devices, such as actuators, communication networks and measuring instruments.

Thanks to this function, it is possible to make applications simply and economically, such as:

- electrical signalling of events, alarms and circuit-breaker trips;
- transmission of electrical measurements to switchboard instruments, or remote control, by means of 4-20 mA signals;
- additional protection of the plant based on measurements of external values, such as pressure and temperature;
- non-priority load control.

According to the methods of connection to the moulded-case and air circuit-breakers, the devices in the Flex Interface family, are identified in:

- Accessory Devices (ADs) which are connected to the trip unit by means of an interfacing unit.
- Local Device (LD) which is connected directly to the trip unit.
- System Devices (SDs) which are connected to an external communication bus, to which a device, such as a Personal Computer, PLC or SCADA is connected.

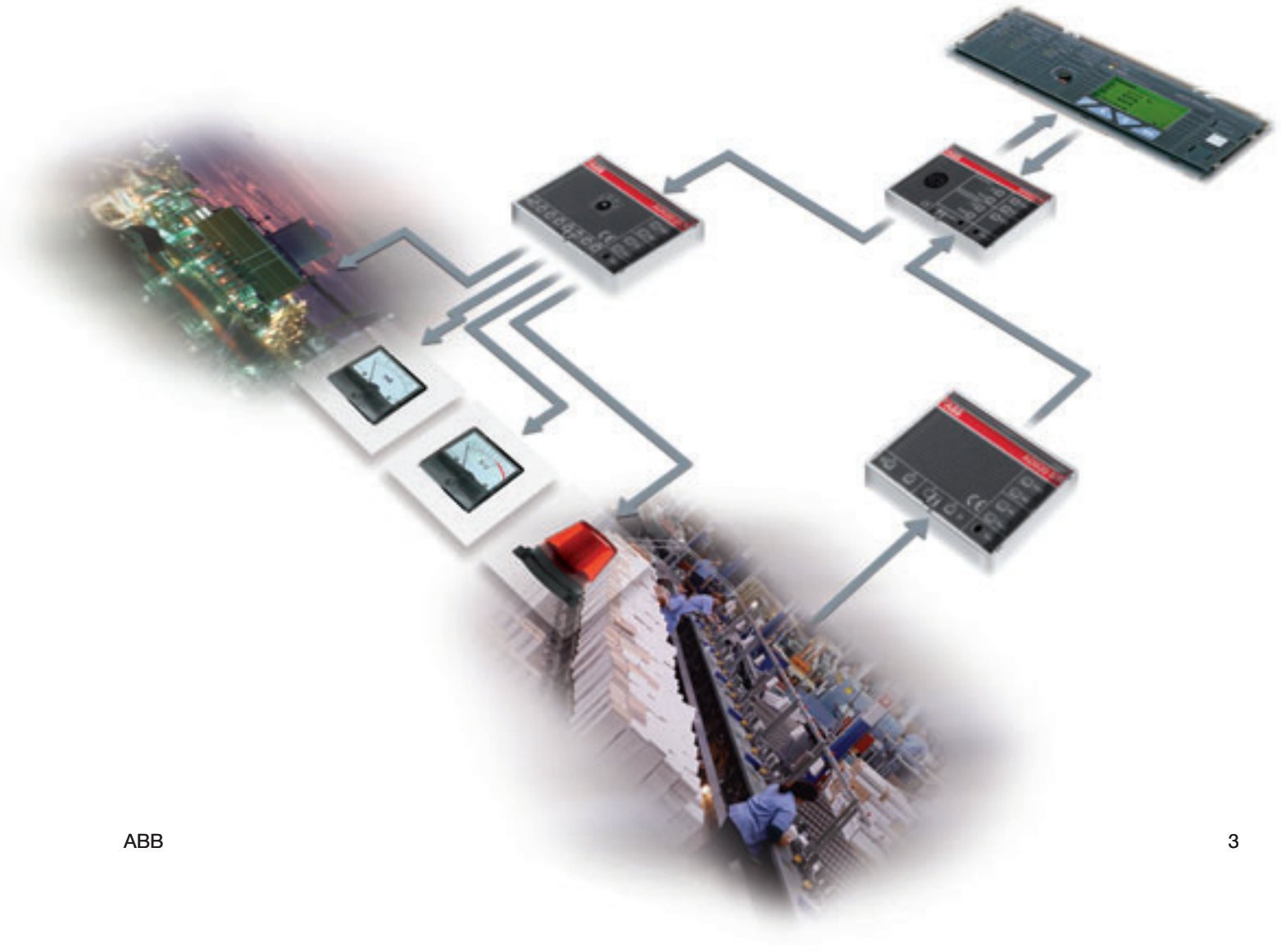
To complete the Flex Interface range, the HMI030 switchboard multimeter is also available, which allows display of all the measurements managed by the trip unit it is connected to.

All the Flex Interface devices are the size of four modular units, with simple and immediate cabling, and require an auxiliary power supply at 24 V DC to function.

Panorama of devices

Accessory Devices – ADs

- **AD030 DO**: this module periodically receives signals from the trip unit, updates the eight digital outputs and the associated LEDs.
- **AD030 AO**: this unit is able to convert the measurement signals which come in from the trip unit into 4-20 mA electrical signals, such as currents, voltages, power, peak factor, energy and frequency. Four analog outputs are available.
- **AD030 MI**: on acquiring signals coming from the external field, this device can convert these into two analog and two digital inputs to be sent to the electronic trip unit in order to obtain protections and signalling.
- **MM030**: this device is always necessary when the Accessory Devices are present. This module is the interface between the circuit-breaker trip unit and the other ADs. It can be connected to all Emax trip units and to PR222DS/PD, PR223EF, PR223DS, PR331/P and PR332/P Tmax trip units.



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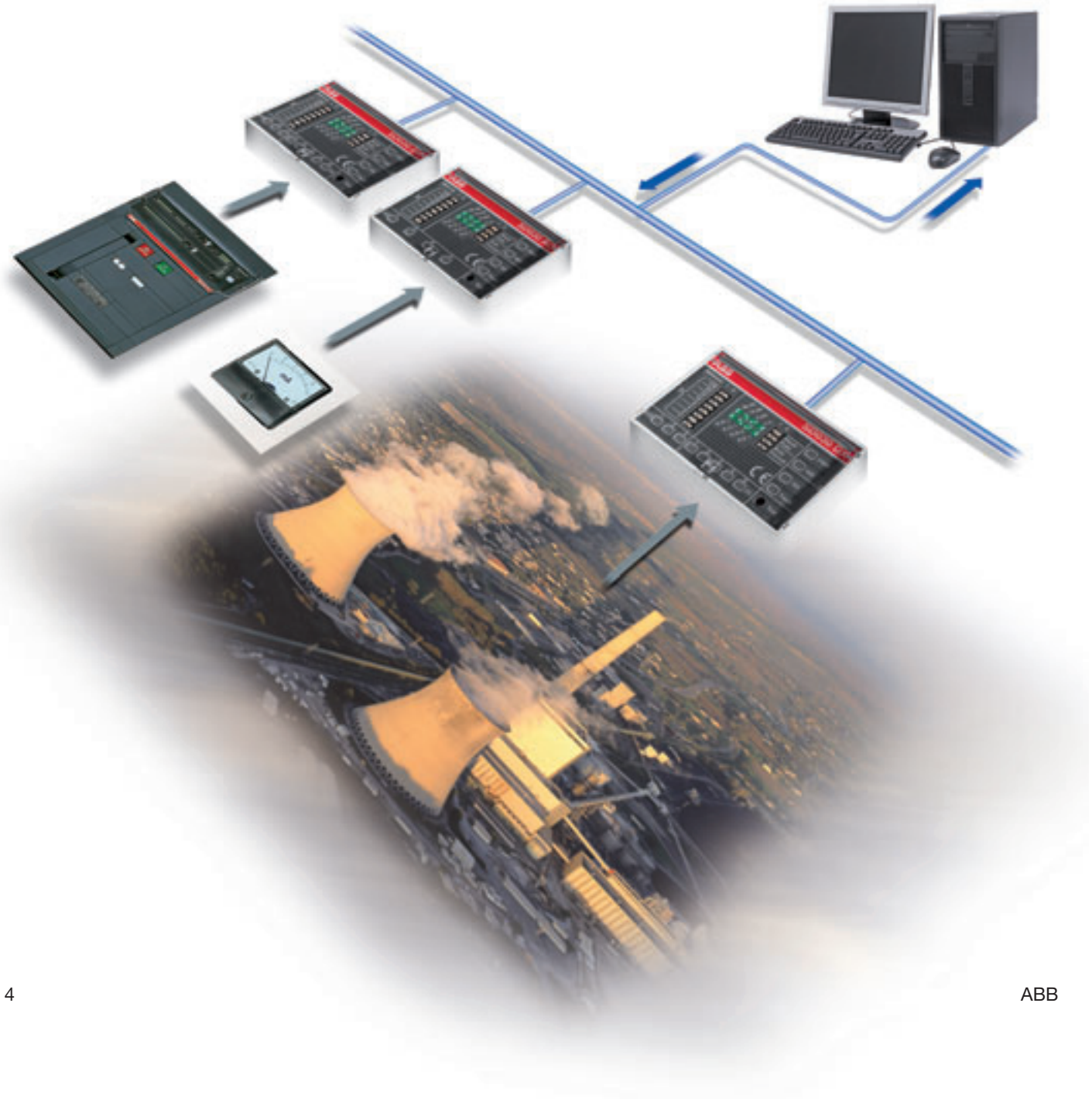
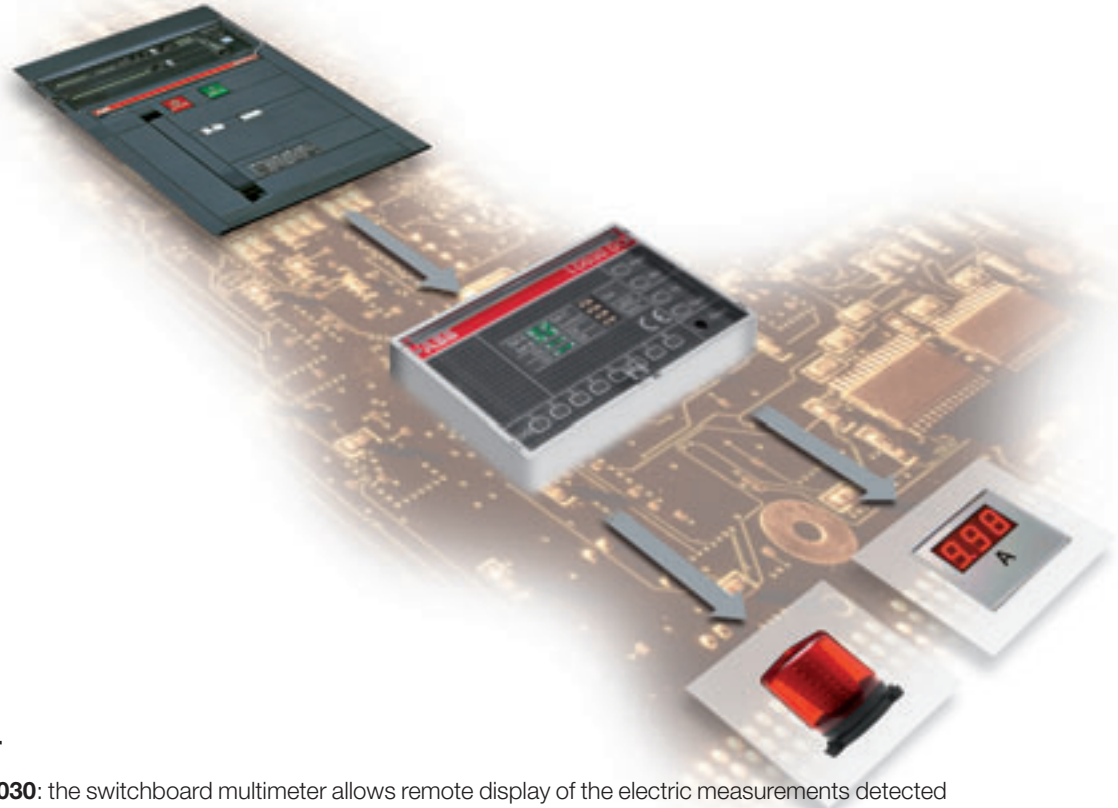
System Devices – SDs

- **SD030 DX**: this is the main device in the System Devices family. It manages five digital inputs and three digital outputs. It allows remote supervision and activation of switch-disconnectors and circuit-breakers without the communication function by means of a SCADA or PLC.
- **SD030 DO**: the module receives data from a PLC and consequently activates the eight digital outputs.
- **SD030 DI**: the module receives data from the external field and transmits them to a main system connected by means of a system bus. Up to eight digital input signals are available.
- **SD030 AO**: the device acquires data from external devices and then activates the four analog outputs (4-20 mA or 0-20 mA electrical signalling).
- **SD030 MI**: the device acquires data from the external field and communicates them to a remote supervision system. Two analog inputs and two digital inputs are available.



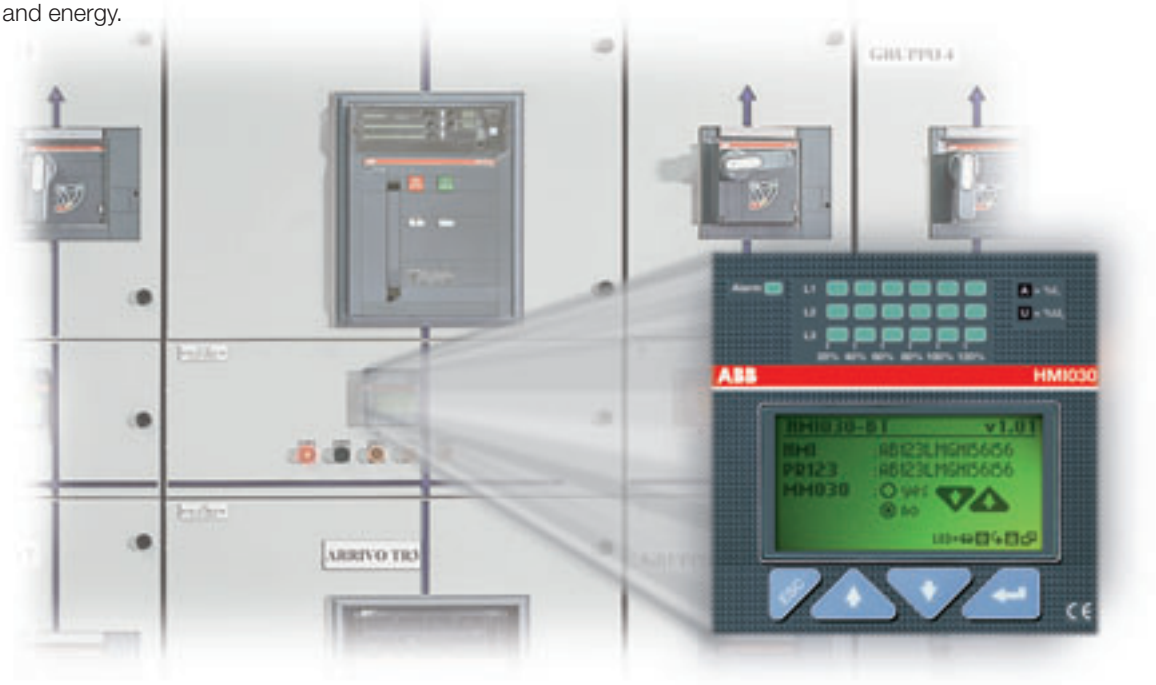
Local Device - LD

- **LD030 DO**: this module, fitted with eight of digital outputs, can be connected to all the electronic trip units in the Emax circuit-breakers and PR222DS/PD, PR223DS, PR223EF, PR331/P and PR332/P trip units in the Tmax circuit-breakers, allowing signalling externally of a very wide range of information and events recorded by the trip unit.



Multimeter

- **HMI030**: the switchboard multimeter allows remote display of the electric measurements detected by the trip unit. The module can be configured using different methods: ammeter, voltmeter, wattmeter and, finally, “custom”. Apart from allowing display of currents, voltages and powers, the “custom” method it allows access to further information, among which frequency, power factor and energy.



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The extreme application flexibility, together with simplicity of installation, make the Flex Interface devices ideal for making a large number applications. Just a few of the numerous solutions which can be made are given below by way of illustration.

Power Meter

Thanks to the Flex Interface devices coupled with trip units fitted with power measurement capability, it's possible to measure the power in a three-phase system without by using the Aron insertion that requires two current transformers, two voltage transformers and a panel display to show the power measured.

In the easy case, it is possible to use the HMI030 connected directly to the trip units. This solution allows optimisation of space and simplifies cabling operations. Furthermore, other measurements are available, for example:

- Power factor
- Frequency
- Energy
- Data of the latest trip

When the MM030 is present it is possible to choose between two further configurations:

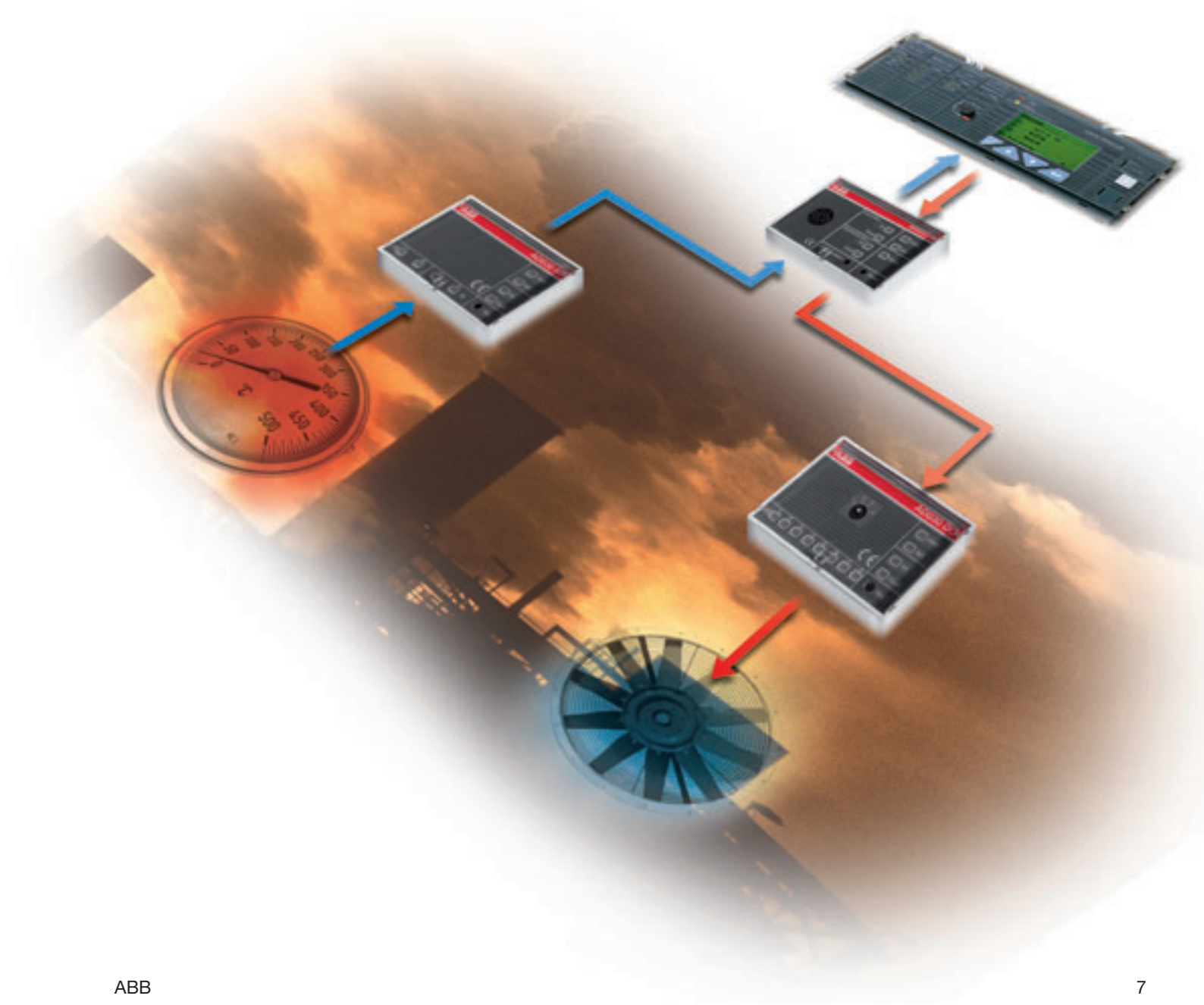
- the first using the AD030 AO, which converts the signals coming from the trip unit into electrical signals from 4 to 20mA on output. These signals can be sent to a panel installed on the front of the switchboard.
- The second using the HMI030. The MM030 unit acquires the measurements from the trip unit and communicates these to the HMI030 which displays the powers. Further measurements are also available, like those already indicated for the first case above.

Activation of the cooling system

A possible solution to manage the ventilation system inside the switchboard can be implemented by means of a PLC which, when it receives the signal as an input from the thermostat, by means of a communication bus, it controls the action of an I/O module able to activate an air conditioning system.

By means of the Flex Interfaces, it is possible obtain a solution which does not envisage the use of a PLC – trip unit communication bus, but only three Flex Interface units: MM030, AD030 MI and AD030 DO.

A 4-20mA thermometer is connected to the AD030 MI device. The trip unit, which receives the signal from the thermometer, passes into a state of alarm when the signal on input exceeds the set threshold. This changeover in state can be used to activate a contact of the AD030 DO unit in order to activate a cooling fan inside the switchboard.



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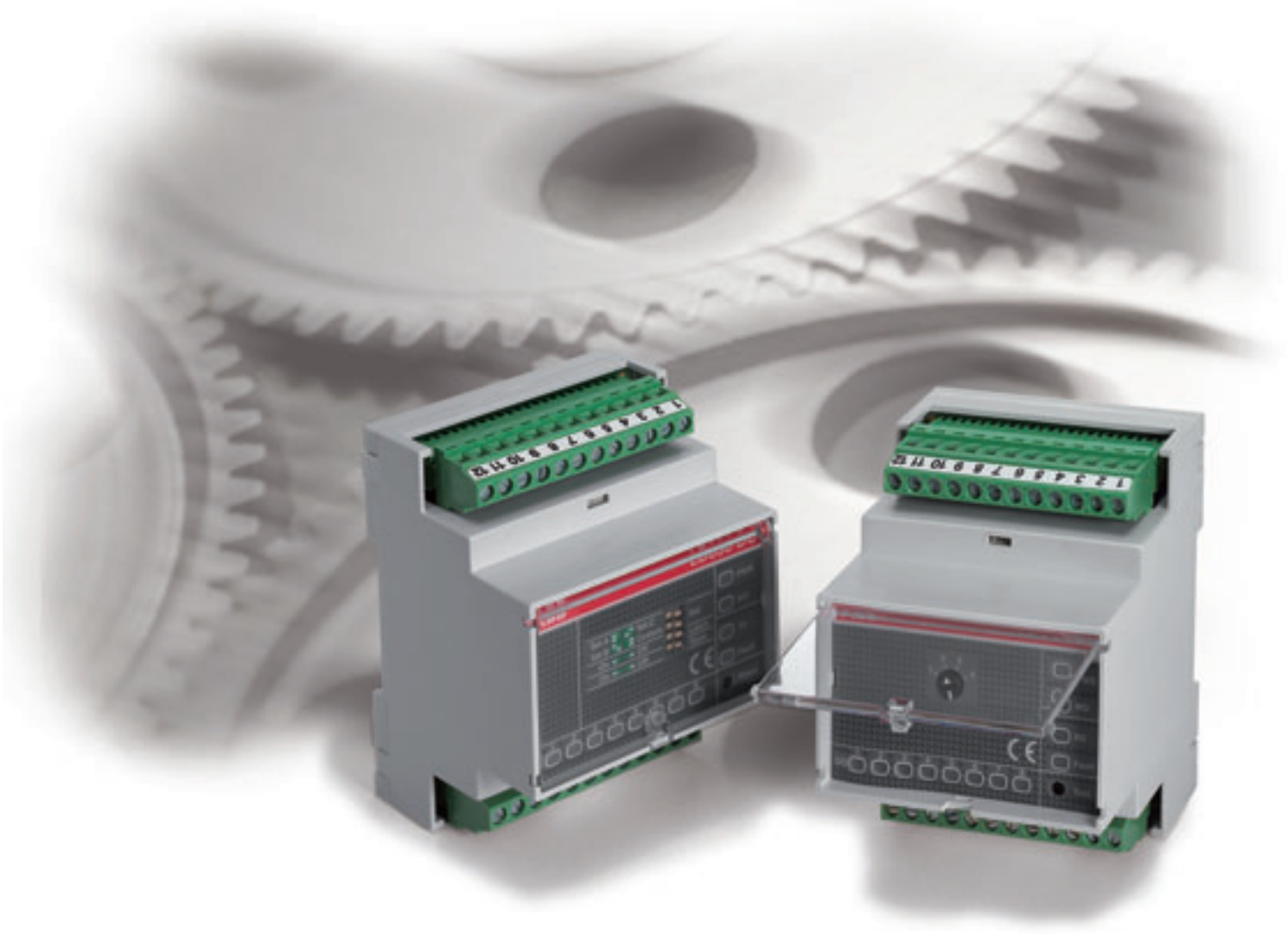
Load Shedding – current control

The load control allows single non-priority loads to be connected and disconnected when the current consumption exceeds a critical threshold.
To implement the load control, a possible solution envisages installation of dedicated units with specific cabling.

Thanks to Flex Interfaces and the load control function of ABB trip units, the application can be obtained using two different methods.

By activating the trip unit load control function, it is possible to set three different current thresholds and manage up to three non-priority loads. In the case where the current value exceeds these set thresholds, the trip unit communicates the change in state and if the module MM030 is already present, the AD030 DO receives the signal and activates the contactor or switch-disconnector to disconnect the load, otherwise it is possible to use the LDO030 DO. In this case, the module is connected directly to the trip unit, receives the signal and allows disconnection of the load.

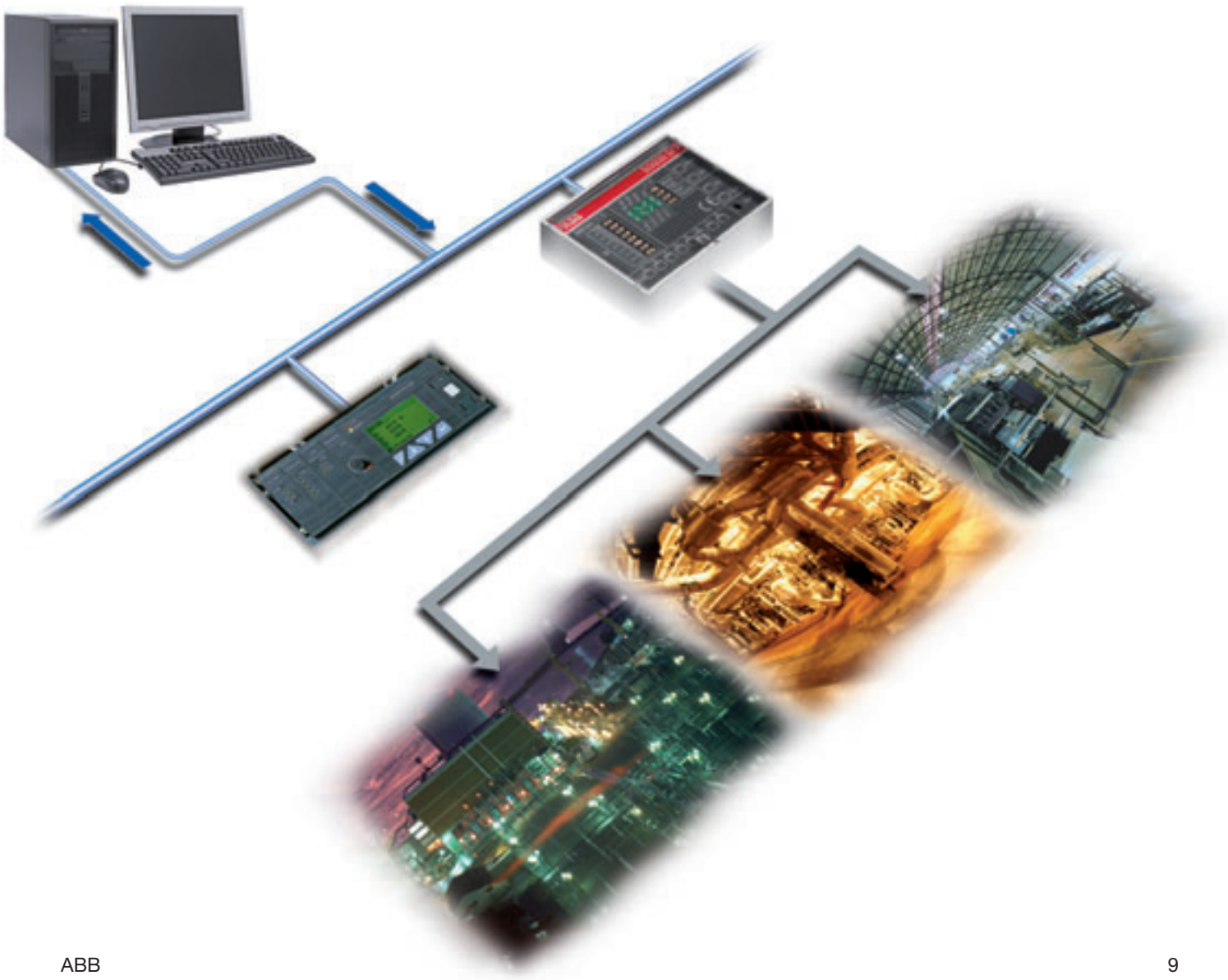


Load Shedding - frequency control

The Flex Interfaces allow load disconnection management in island networks, where the power consumption exceeds the generating capacity. In the case of unbalance between the maximum deliverable power and the power required by the loads, the network frequency tends to decrease.
A possible application envisages a dedicated underfrequency release.
By using the Flex Interfaces, with the aim of managing load disconnection according to the decrease in the network frequency, it is possible to use a system which envisages:

- a trip unit with frequency measurement capability
- a PLC on a system bus, for example Modbus
- the SD030DO module

The PLC receives the frequency measurement signal from the trip unit and, in the case of a minimum threshold being reached, sends a signal to the SD030DO which consequently changes over its contacts. This solution allows management of up to 8 different loads.



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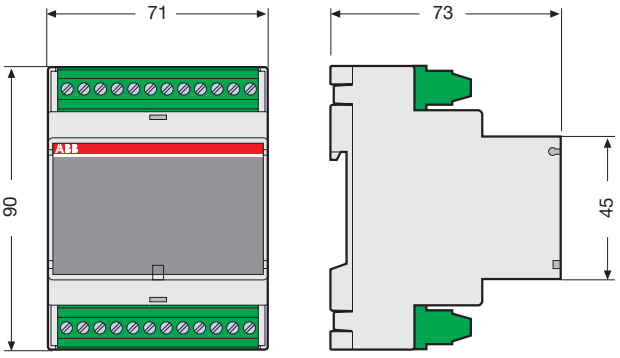
Technical details

		Contacts
ADs	AD030 AO	4 analog outputs
	AD030 DO	8 digital outputs
	AD030 MI	2 analog inputs 2 digital inputs
SDs	SD030 AO	4 analog outputs
	SD030 DO	8 digital outputs
	SD030 MI	2 analog inputs 2 digital inputs
	SD030 DI	8 digital inputs
	SD030 DX	5 digital inputs 3 digital outputs
LD	LD030 DO	8 digital outputs

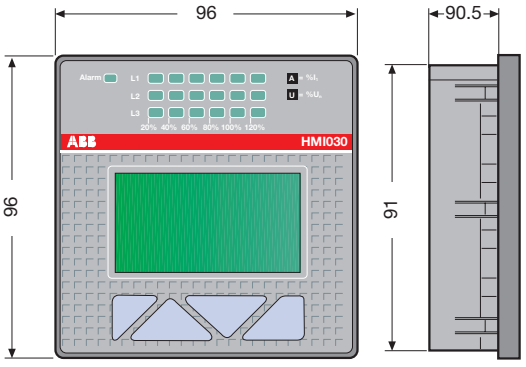
Type	Monostable SPDT
Maximum breaking capacity	150 W / 2 kVA (resistive load)
Maximum breaking voltage	30 V DC / 250 V AC
Maximum breaking current	5 A @ 30 V DC (resistive load)
	8 A @ 250 V AC (resistive load)

Overall dimensions

MM030 - AD030 DO - AD030 AO - AD030 MI - SD030 DX - SD030 DO
SD030 DI - SD030 AO - SD030 MI - LD030 DO



HMI030



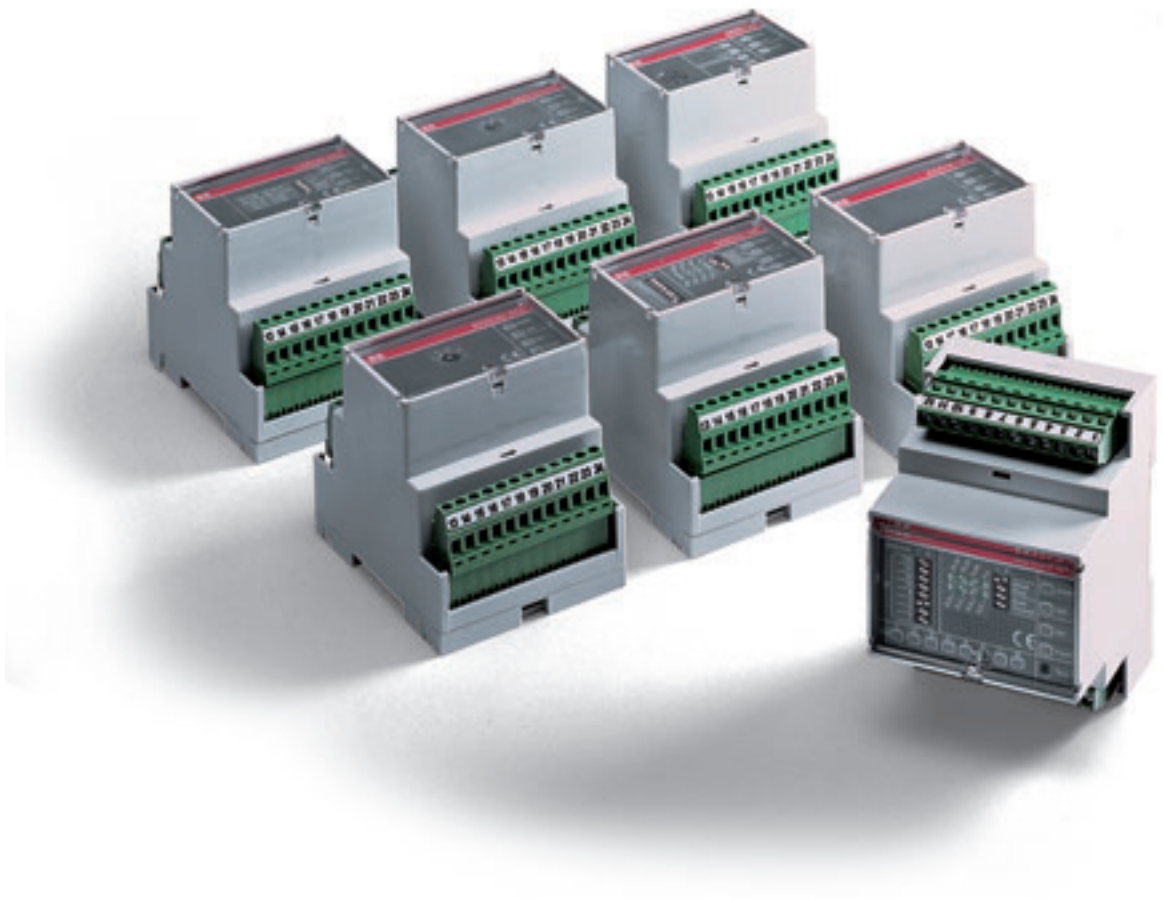
Ordering Codes

Accessory Devices	Code
MM030	1SDA064268R1
AD030 DO	1SDA064513R1
AD030 AO	1SDA064572R1
AD030 MI	1SDA064573R1

System Devices	Code
SD030 DX	1SDA064578R1
SD030 D0	1SDA064514R1
SD030 DI	1SDA064575R1
SD030 AO	1SDA064576R1
SD030 MI	1SDA064577R1

Local Device	Code
LD030 DO	1SDA064574R1

Multimeter	Code
HMI030	1SDA063143R1



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