Underground MV Network Management

ICONTROL-T - Remote network control

SWITCH REMOTE CONTROL INTERFACE
AUTOMATIC POWER SOURCE PERMUTATION

The IControl-T box offers all the functions required to operate MV systems fitted with motorised switches either remotely or locally.

MADE IN FRANCE

Enedis APPROVED

Fitted to MV/LV substations, branch circuit disconnection substations or branching points, this box provides remote control and/or automated management for MV distribution networks.

Fitted to double bypass substations, this box can provide automatic permutation between supply sources.

Tertiary

Industry

Energy storage

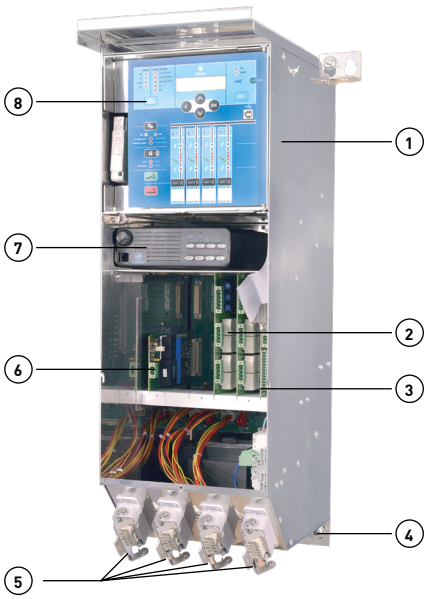
Transport

Renewable energies

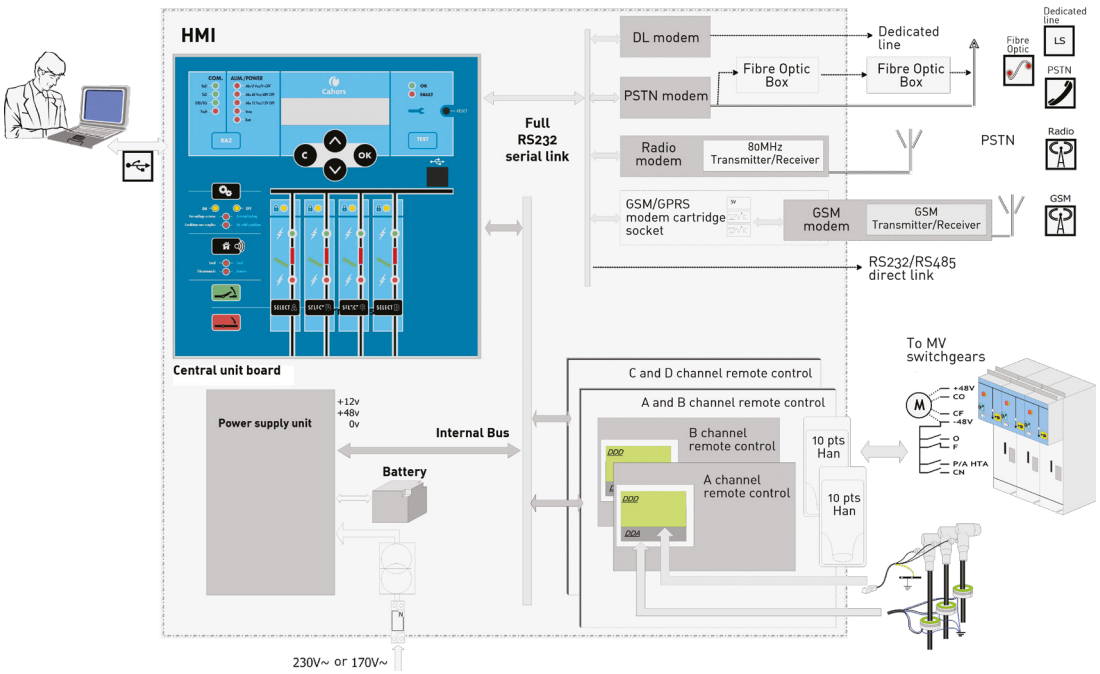
> DESCRIPTION

This box is of modular construction to suit different requirements.

It is composed of electronic subassemblies, each performing a particular function.



1 - Battery
2 - Remote control / fault detection boards
3 - Power supply unit board
4 - Connection inputs (cable glands)
5 - Link connectors to MV switches (electrical control).
6 - Communication modem board
7 - Radio slot
8 - Central unit / HMI.



Operation

Electrical control

The box electrically controls the opening or closing of MV switches. Those controls can be electrically and individually operated as required (Tumbler mechanism), or “hooked”.

Automated systems

- The automatic power source permutator is used to toggle MV switches automatically if the main power supply source fails.This automated system thus quickly restores power to the substation.
- The alarm-equipped decentralised automated system is used to isolate a faulty section by commanding the switch to open. That command is carried out during the voltage dip in the supply substation isolating switch re-engagement cycle.

Communication

The box communicates with the network manager’s monitoring system (SCADA) using :

- a communication medium: public switched telephone network (PSTN), radio network, dedicated line (DL), GSM/GPRS or other network ;
- a communication protocol (IEC 60870, DNP3, HNZ or other).

> BENEFITS OF THE RANGE

Ergonomic fitting and installation : due to its small size, this box is easily fitted into small substations, mounted either horizontally or vertically.

USB link : box settings can be adjusted with no power source other than the PC.

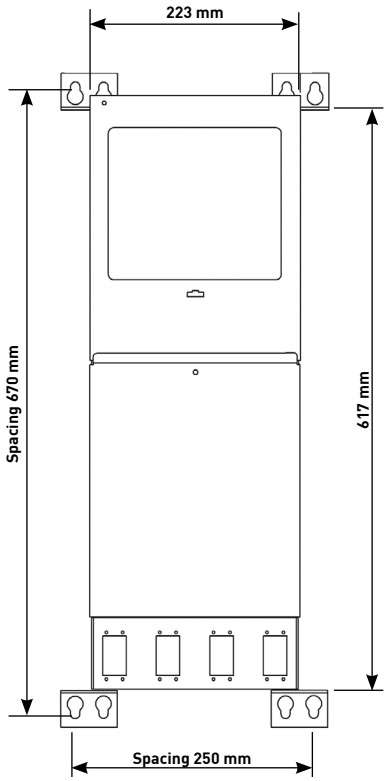
Configuration and setting via an onboard server.

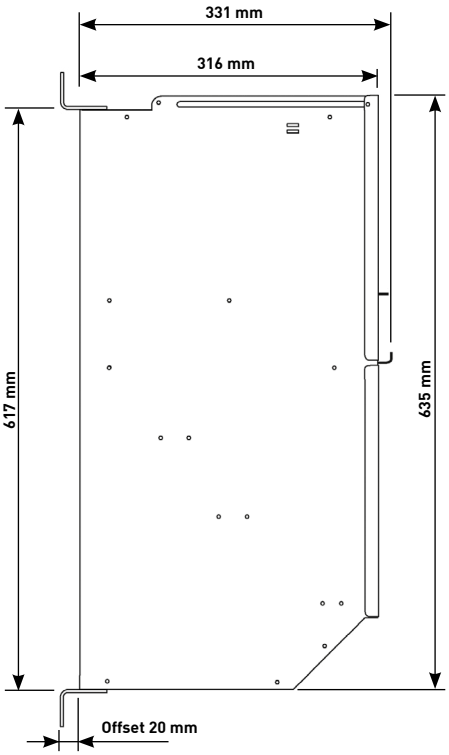
> ELECTRICAL CHARACTERISTICS

IControl-T	
Capacity	
Number of channels	1 to 8 channels
Electrical control actuator : • Type • Power supply • Other : contact us	 “TUMBLER” mechanism or “hooked” 48 V / 5 A
Additional I/O	4 inputs and 1 switch output
Power supply unit	
Supply voltage	230 V or 173 V (+/- 15%), 50 Hz
Consumption	86 VA - batteries on charge 37 VA - charged batteries
Battery : • Type • Number • Capacity • Autonomy • Monitoring	 Sealed lead 1 12 V - 38 Ah > to 24 h (10 O/C cycles after 16 hrs) Charge offset based on temperature and limited to 4 A Deep cycle discharge monitoring Periodic tests
Service life	> 5 years
Communication	
Media : • Public Switched telephone network (PSTN) • GSM • Private Radio network • Dedicated connection (LS2 or 4-wire) • RS232, RS485 2 or 4-wire, optical fibre • GRPS • Ethernet	 V21/300, V22/1200, V22Bis/2400 and V32/9600 bauds V32/9600 bauds V23/600 bauds and V23/1200 bauds FFSK/1200 bauds and FFSK/2400 bauds V23/600 bauds and V23/1200 bauds Configurable speed and parity 10/100 BASE T
Protocols	MODBUS-IP / MODBUS-RTU CEI 60870-5-101 CEI 60870-5-104 DNP3 HNZ (Enedis specification)
Other	Contact us
Fault indication	
Number of channels monitored	From 1 to 8 channels
Sensitivity adjustment : • Polyphase fault • Dual single-phase fault • Single-phase earth fault : - Amperemetric - Directional	 Configurable from 200 to 1600 A Configurable from 200 to 1600 A Configurable from 5 to 240 A Residual current transient > 30 A peak
Time adjustment : • Fault duration • Duration of delay for validation • Permanent fault recognition time	 Configurable from 0,02 to 1 sec Configurable from 0,3 to 3 sec Configurable : 1, 10, 40 or 70 sec
MV Current sensors	
Set of three open-ended moulded cores for single-core cables : • Core types • Transformation ratio • Precision class • MV cable capacity	 Opening, moulded resin box 500/1 3P2 Class 45 mm max. diameter
MV Voltage sensors	
Compatible sensor type : • Capacitive dividers • Voltage measurement transformer	 Value from 0,6 pF to 9 pF Secondary value : 100 V/$\sqrt{3}$
Input dynamic	Between 1,9 V and 60 V ms

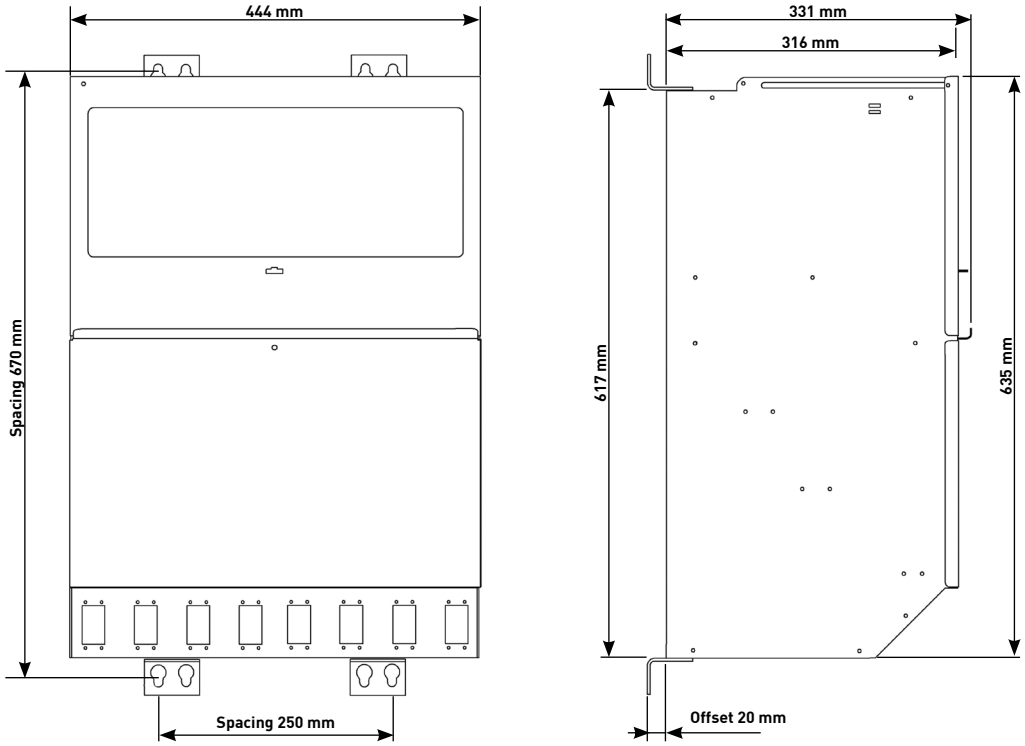
Installation example

IControl-T (4 channels)

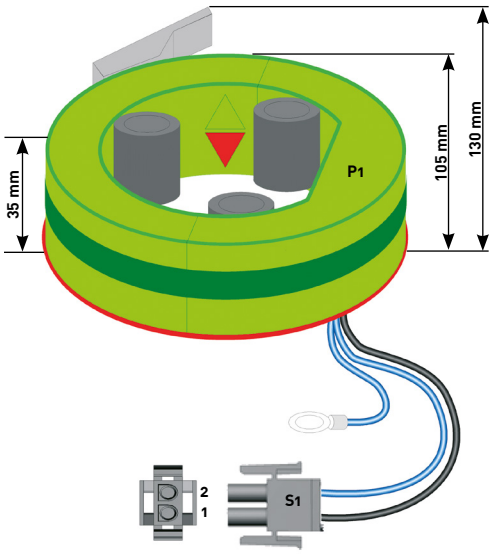




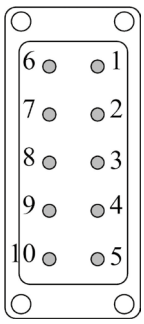
IControl-T (8 channels)



Current core to be fitted to MV supply cables



> CONNECTOR



Pin no.	Function	Abbreviation
1	0 V (- polarity for 48 V)	-48
2	Close command	CF
3	Open command	CO
4	MV switch open	O
5	MV switch closed	F
6	48 V (+ polarity for 48 V)	+48
7	Neutralised switch	CN
8	MV voltage present / absent	P/A U MT
9	Not used (set to 0 V)	
10	Not used (set to 0 V)	

> ENVIRONMENTAL USE CONDITIONS

IControl-T	
Protection rating	
IP	IP 2XC
IK	IK 07
Climatic conditions	
- Operating temperature	- 15°C to + 55°C
- Storage temperature	- 25°C to + 70°C
- Average relative humidity over 24 hrs	> 95%
Dielectric strength	
- Main supply inputs	Isolation 50 Hz / 1 mn : 10 kV / Shock wave 1,2 / 50 µs : 20 kV
- PSTN or DL inp	Isolation 50 Hz / 1 mn : 10 kV / Shock wave 1,2 / 50 µs : 20 kV
- Other inputs (Current cores, PPACS, ...)	Isolation 50 Hz / 1 mn : 2 kV / Shock wave 1,2 / 50 µs : 5 kV

> STANDARDS/ SPECIFICATIONS

- **HN 64-S-44 :** Interfacing unit for the remote control of 400A switches (ITI / PASA).
- **HN 45-S-53 :** Remote Controlled Substations with non permanent link.
- **HN 64-S-43 :** Electrical independent-operating mechanism for 24 Kv - 400 A switch.
- **HNZ 66-S-11 :** Procedure for the transmission of industrial data.
- **HNZ 66-S-13 :** Procedure for the transmission of industrial data.
  Specifications for exchange PLC in simplified master-master mode.
- **CEI 60870-5 :** Remote control systems and equipment.
  - Part 5 : Transmission protocol.
  - Part 5-101 : Transmission protocol.
    Standard to accompany basic remote control tasks.
  - Part 5-104 : Transmission protocol.
    Access to networks using transport profiles standardised for IEC 60870-5-101.