

Multi-function industrial radio remote control systems offering a high level of safety

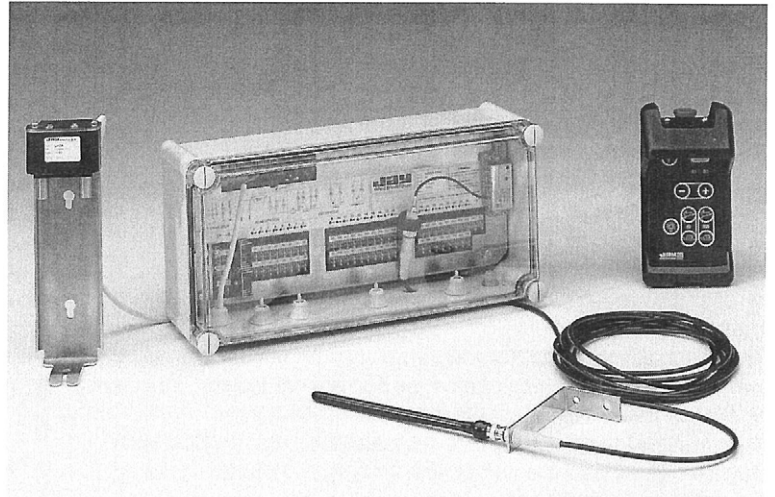
UX series



Typical applications

- ◆ **On-board equipment**
 - vehicle-carrying vehicles

- ◆ **Industrial machines**
 - for manual control of machine subassemblies during maintenance of automated machines



Description 1

The radio remote control system provides a number of important advantages:

- significant freedom of movement
- ease of use
- manoeuvring precision and quality
- visibility

With the new UX series of remote control systems, Jay Electronique provides answers for those applications requiring a large number of functions, in a system characterised by the small dimensions of the transmitter and receiver units.

The UX series takes into account the safety requirements contained in the future European standards.

The redundancy built into the reception system, equipped with two independent microprocessors, ensures continuous self-testing of safety stop function.

The UX series is also designed to support the environment conditions encountered by a system installed on a vehicle.

What is more, it was decided during the design phase of the UX series to provide a large number of available frequencies in the 400 MHz band width and to build in sufficient transmission power to ensure simultaneously: optimal transmission quality, control over power to avoid needlessly occupying radio bands, correct operation of many other nearby units.

Finally, the transmitter was designed with ergonomics in mind and can be equipped with a foam protection cover that significantly increases the service life of the remote-control system in harsh environments where knocks are frequent.

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- Radio approvals:
France, United Kingdom
Certification in progress
for other countries
- Compliance with following
European directives:
 - Machines:
category 3 passive safety stop
as defined by EN 954-1
 - Electromagnetic compatibility,
CE type test certification Emitech



The UX series remote-control systems were designed in compliance with requirements contained in the Machines Directive 89/392/EEC (as modified), concerning control systems.

2/1 UX series remote-control systems provide, among other features:

◆ A momentary radio link.

The link is non directional and insensitive to obstacles, thus reducing to a minimum the risks run by operators during difficult manoeuvring and movements.

◆ Each transmitter/receiver set is individually coded.

◆ Receiver with two signal-processing units that work independently and compare their results.

◆ System features designed to handle abnormal situations, notably high interference.

◆ Start-up sequences ensure that no commands are entered inadvertently by the operator.

◆ Response time of approximately 250 milliseconds, compatible with the travelling speeds of most equipment controlled.

◆ A passive safety stop command (see section 2/2).

◆ In addition to the safety features described above, UX series remote-control systems comprise a number of features designed to enhance operator safety both when starting up and during operation of the system. These features include:

- obligatory two-handed operation to ensure that all commands are intentional;

- a "dead-man" function which shuts down the transmitter if no commands are issued for a period of two minutes. Once the transmitter has been shut down, a new start-up sequence is required before new commands may be issued;

- simple layout of the transmitter front panel and simple operation, thus making unwanted action very improbable;

- a battery alarm light;

- fuse protection of the equipment (fuse on common line of the relays and on power supply).

2/2 Shutdown sequence

Activation of the palm-button on the transmitter cuts the transmitter power supply. Shutdown of the transmitter in turn leads to a stop order issued to the receiver (passive safety stop). The receiver then de-energises the control outputs. The safety stop function is also tripped if interference disturbs the radio link for over one second or if erroneous frames are received.

Optimum installation conditions

3/1 Wiring of control circuits

For an installation with optimum security conditions, the control circuits downstream of the receiver must be designed in compliance with the requirements determining the safety category of the receiver.

3/2 Selection of frequencies

The UX series offers 64 frequencies in the 433 MHz band and 12 frequencies in the 458 MHz band (see the list on page 7). On sites where several remote-control systems are used, a different frequency must be used for each transmitter/receiver set.

On sites where the number of remote-control systems used exceeds the number of available frequencies, two receivers using the same frequency must be located at least 500 metres from each other.

3/3 Installation of antennas

The simplest method to ensure correct reception is to install antennas perpendicular to and as far away from metal surfaces as possible. The 5-metre extension cable and the antenna support bracket supplied with the receiver may be used to increase distances.

4/1 UXR receivers

Physical characteristics and climatic withstand capacity

Housing, degree of protection	ABS (base), PC (cover), IP 65
Mounting system	4 M6 screws
Connection to equipment	◆ Faston terminal lugs, 6.35 mm ◆ Cable entry: 7 grommets 5 x PG16 2 x PG9
Weight	2.65 kg (26-channel version)
Operating temperature range	-20° C to +65° C
Storage temperature range	-30° C to +65° C

Radio characteristics

Frequency	1 frequency per device, 433 and 458 MHz bands (see list of frequencies on page 7)
Receiver antenna connector	BNC type, 50 Ohm
Antenna	Sheathed, flexible whip antenna, 1/4 wave
Tuner	UHF
Sensitivity	Better than 1 µV

Technical characteristics

Power supply	Voltage	24 V DC +25% -15%	
	Power consumption	250 mA	
Outputs	Control	◆ 16 transistor outputs (8 functions x 2 movements) or 36 transistor outputs (18 functions x 2 movements) or 52 transistor outputs (26 functions x 2 movements) ◆ 2 transistor outputs for demultiplexing ◆ Transistor outputs NPN 24 V DC 1.5 A with common line protected by 8 A fuse ◆ 1 output relay w/ 1 NO contact for "radio link established" ◆ 1 output relay w/ 1 NO contact for "charging light"	
		Response time	< 250 ms
		Indications	1 red light indicating "radio reception"
			2 red lights indicating "system energised"
2 green lights indicating "demultiplexing"			
Protection	Power supply + contact common line	time-delayed 8 A fuse	
	Power supply	surge limiters and filtering elements	

4/2 UXC charger

Charging time	< 14 hours
Weight	720 g
Charging temperature range	-10° C to +65° C
Storage temperature range	-30° C to +65° C

4/3 UXE transmitter

Physical characteristics and climatic withstand capacity

Housing	<ul style="list-style-type: none"> ◆ Black ABS, IP 65 ◆ Polyurethane foam protection cover ◆ Carrying sling
Buttons	<ul style="list-style-type: none"> ◆ Average service life: 1 million operations ◆ One-speed buttons
Operating temperature range	-20° C to +65° C
Storage temperature range	-30° C to +65° C
Battery-charge temperature range	+10° C to +65° C -
Weight	500 g

Functional characteristics

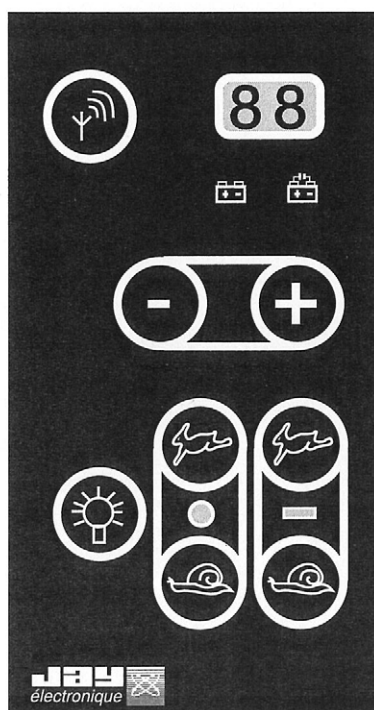
Functions	<ul style="list-style-type: none"> ◆ 2 buttons to increment/decrement function numbers (26 functions maximum) ◆ 1 function-number display ◆ 1 button for start-up and validation of function number ◆ 4 buttons for movement orders and multiplexing ◆ 1 button for radio transmission
Indications	<ul style="list-style-type: none"> ◆ “battery discharged” light ◆ “battery charging” light ◆ lamps indicating the position of movement buttons for night work
Commands	<ul style="list-style-type: none"> ◆ not simultaneous

Electrical and radio characteristics

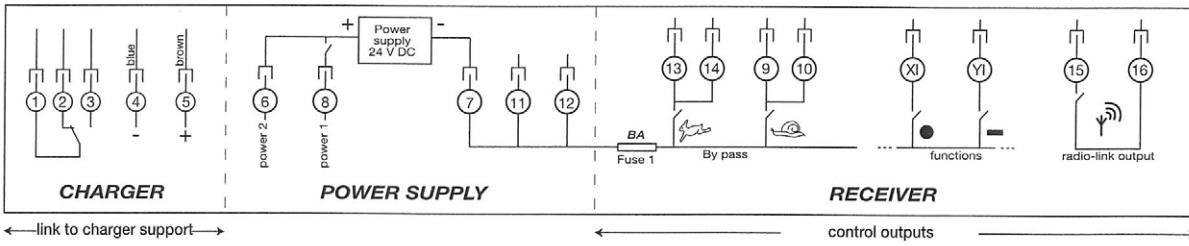
Power supply	rechargeable battery
Battery time	3 hours
Transmission module	1 frequency per device
Transmission frequency	UHF, 433 MHz and 458 MHz bands (see list of frequencies on page 7)
Radio link	momentary (when “radio transmission” button pressed)
Modulation	FM
Coding	6 561 different codes possible
Transmission power	< 1 mW
Average range	50 meters through unobstructed space (1)

(1) The range may vary according to prevailing environmental conditions to which the transmitter and receiver antenna are subject (frameworks, metal partitions, etc.).

4/4 Front panel of UXE transmitter



5/1 Identification of terminals on receiver UXR



5/1 UXR receiver connection diagram for control of hydraulic circuits

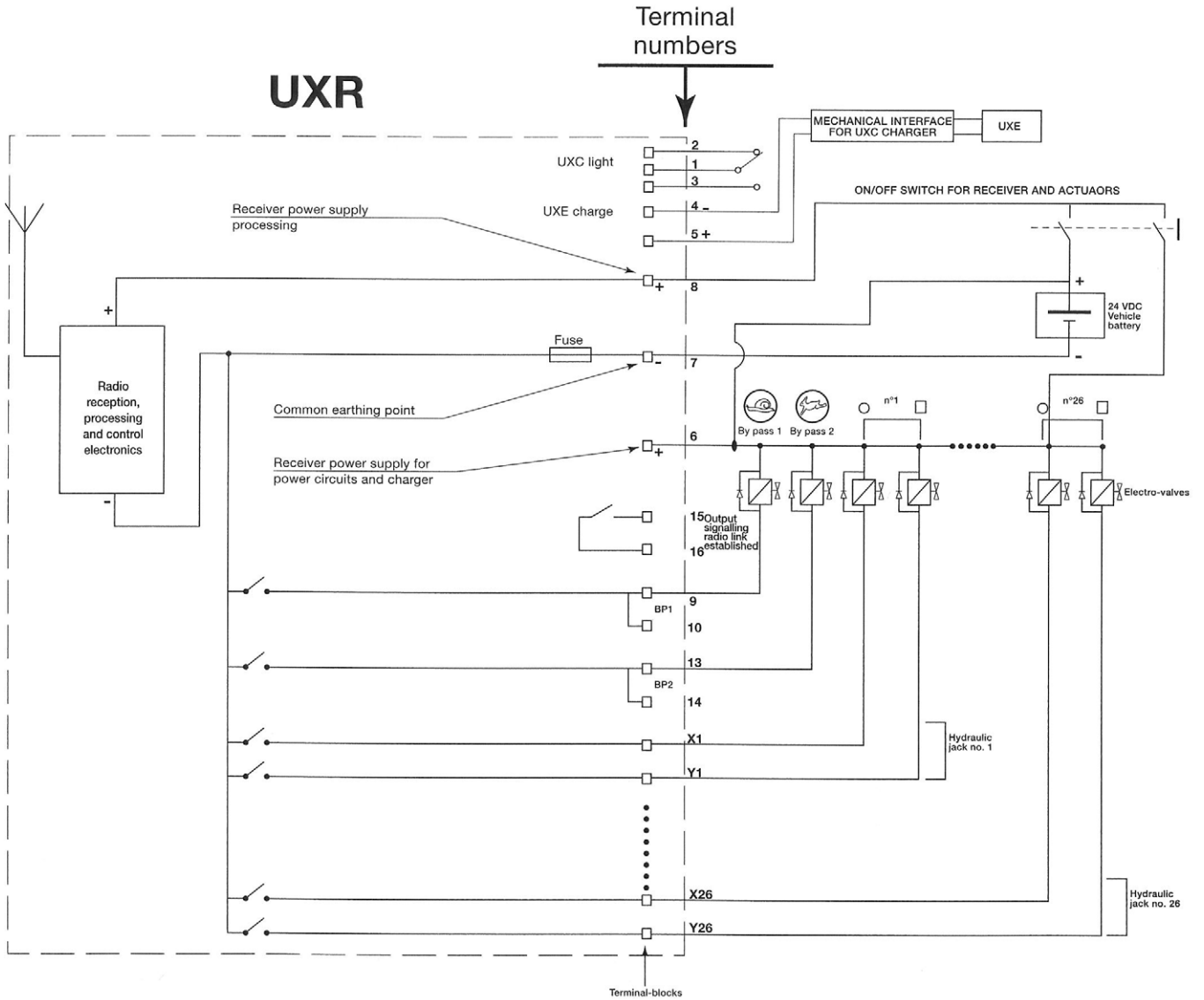
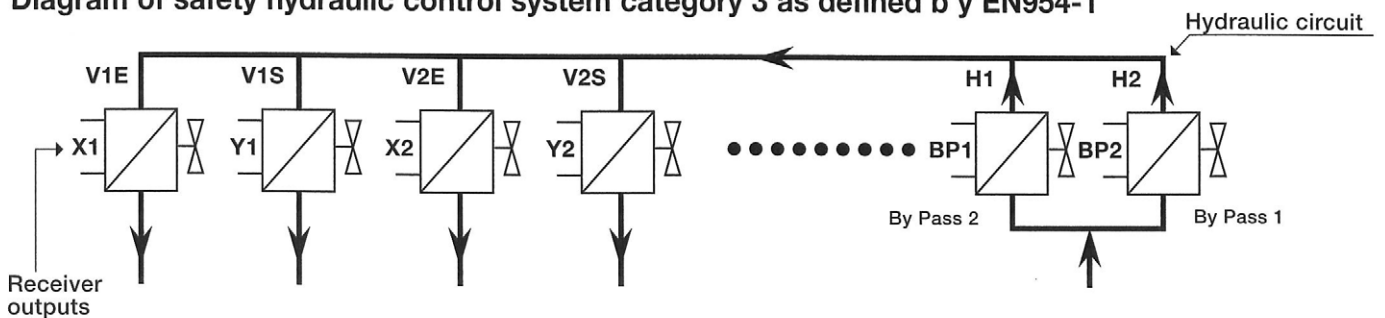


Diagram of safety hydraulic control system category 3 as defined by EN954-1



5/3 UXR receiver connection diagram for control of electrical circuits

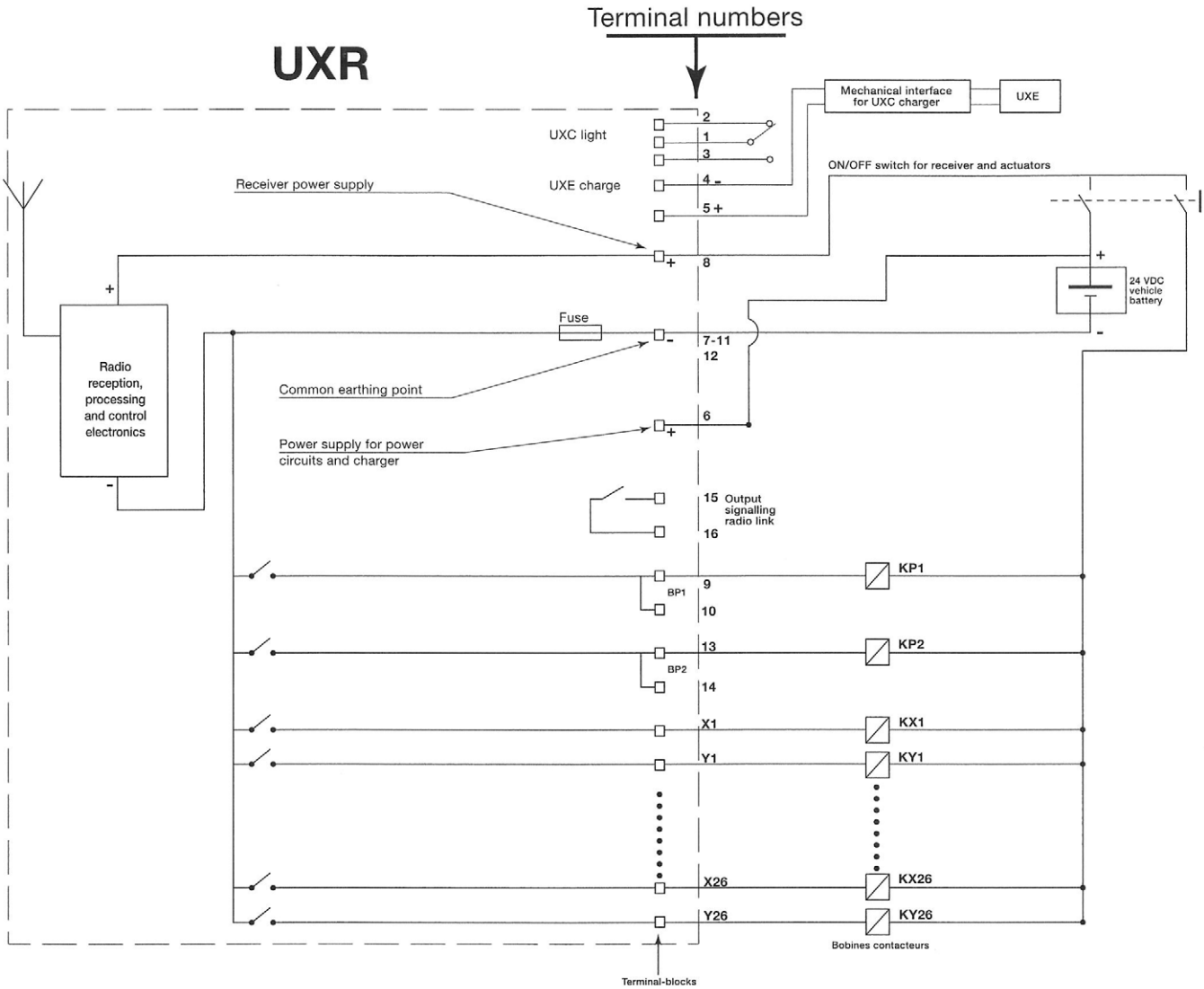
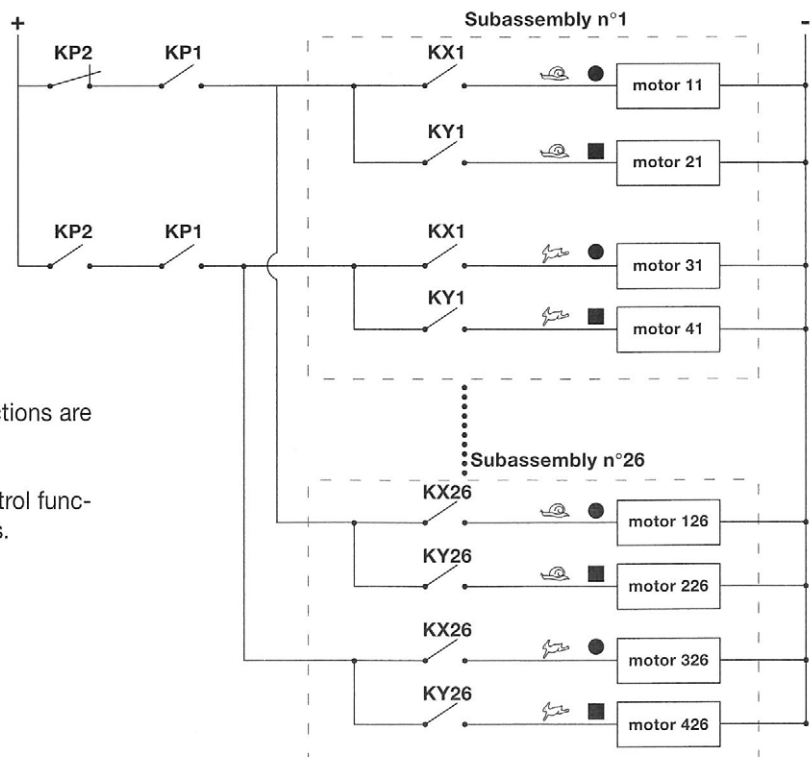


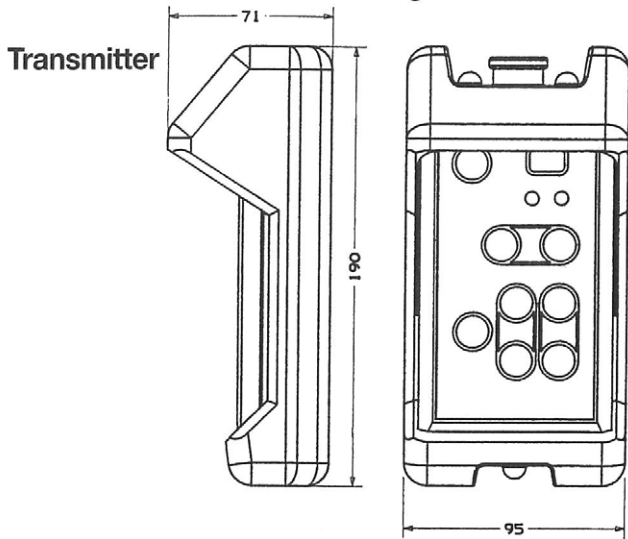
Diagram of electrical control system category B as defined by EN 954-1



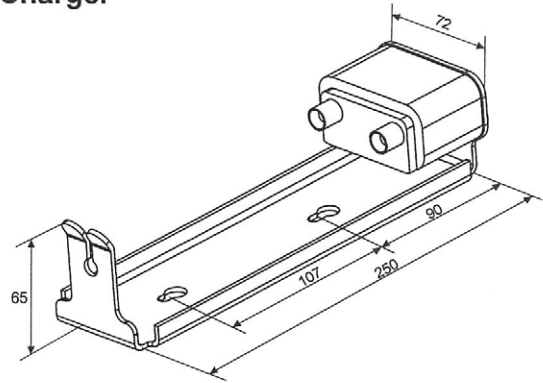
Other simpler wiring systems are possible, if less functions are implemented.

For non-dangerous applications requiring latched control functions, the contactors may be replaced by bistable relays.

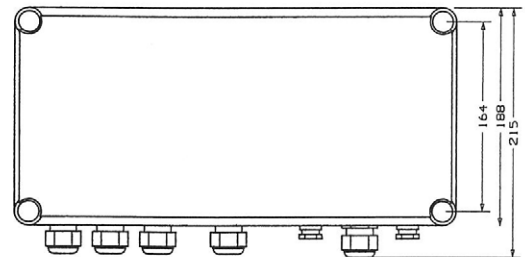
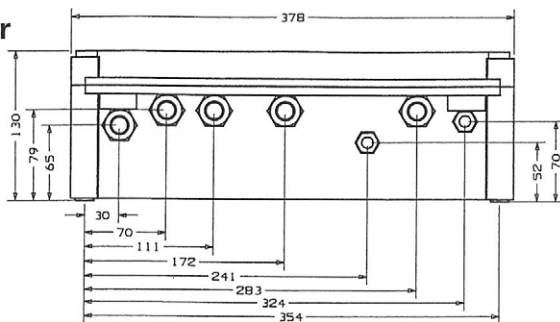
6/1 Dimensions and mounting



Charger



Receiver



List of frequencies

7/1 For Europe (not including the U.K.)

Frequency code	Frequency in MHz
E01	433,1000
E02	433,1250
E03	433,1500
E04	433,1750
*E05	433,2000
E06	433,2250
E07	433,2500
E08	433,2750
*E09	433,3000
E10	433,3250
E11	433,3500
E12	433,3750
E13	433,4000
E14	433,4250
E15	433,4500
E16	433,4750
E17	433,5000
E18	433,5250
E19	433,5500
E20	433,5750
E21	433,6000
E22	433,6250
E23	433,6500
E24	433,6750
*E25	433,7000
E26	433,7250
E27	433,7500

Frequency code	Frequency in MHz
E28	433,7750
E29	433,8000
E30	433,8250
E31	433,8500
E32	433,8750
E33	433,9000
E34	433,9250
E35	433,9500
E36	433,9750
E37	434,0000
E38	434,0250
E39	434,0500
*E40	434,0750
E41	434,1000
E42	434,1250
E43	434,1500
E44	434,1750
E45	434,2000
E46	434,2250
E47	434,2500
E48	434,2750
E49	434,3000
E50	434,3250
E51	434,3500
E52	434,3750
E53	434,4000
E54	434,4250

Frequency code	Frequency in MHz
E55	434,4500
E56	434,4750
E57	434,5000
E58	434,5250
E59	434,5500
E60	434,5750
*E61	434,6000
E62	434,6250
E63	434,6500
E64	434,6750

* Recommended frequencies

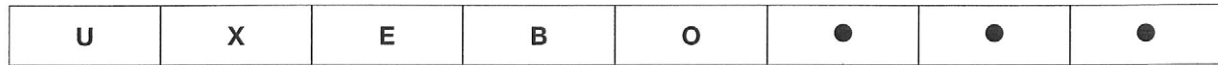
7/2 For the United Kingdom

Frequency code	Frequency in MHz
*H01	458,5125
H03	458,5375
H05	458,5625
H07	458,5875
H09	458,6125
H11	458,6375
H13	458,6625
H15	458,6875
H17	458,7125
H19	458,7375
H21	458,7625
*H23	458,7875

* Recommended frequencies

8/1 Part numbers for ordering

Transmitter



VERSIONS
E for Europe
H for the United Kingdom

FREQUENCY NUMBER (see list page 7)
Version for Europe
64 frequency codes from 01 to 64, including five recommended
Version for the United Kingdom
12 uneven frequency codes from 01 to 23, including two recommended

Receiver



NUMBER OF FUNCTIONS
1 = 8 functions
2 = 18 functions
3 = 26 functions

VERSIONS
E for Europe
H for the United Kingdom

POWER SUPPLY
24 V DC

FREQUENCY NUMBER (see list page 7)
Version for Europe
64 frequency codes from 01 to 64, including five recommended
Version for the United Kingdom
12 uneven frequency codes from 01 to 23, including two recommended

NOTE : *The receiver is supplied with an antenna and a 5-meter antenna extension cable.*

Charger



This charger comprises only the mechanical parts. The electronics are built into the receiver. The charger is supplied with a 1-meter cable for connection to the receiver.