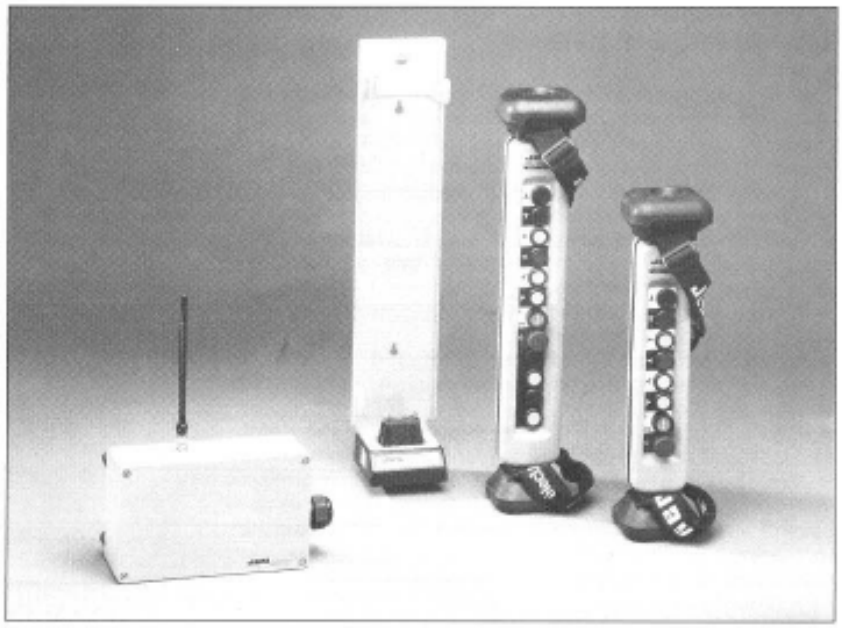
Industrial radio remote control systems

UP series

CE

Typical applications

- Overhead traveling cranes
- Gantry cranes, tower cranes, lifting equipment
- Maintenance cradles
- Industrial equipment
- Building industry and civil engineering equipment



Sturdy, flexible industrial radio remote control system

CONTENTS

Description 1

Jay Electronique's new UP radio remote control system is designed to meet the most demanding requirements of today's users through its state of the art technology and an innovative combination of sturdiness, flexibility and safety features.

1/1 - Increased resistance to shocks

By its extensive experience (15 000 sites equipped with JAY radio remote control systems), Jay Electronique is constantly in pace with the most rigorous industry requirements.

Shockproof ergonomic housing

The UP housing's «one-hand» ergonomic design also provides high shock resistance through the use of shock-absorbing protectors, significantly increasing service life in rough-service environments. The remote control is fitted at each end with heavy-duty shock absorbers ensuring optimum protection if the unit is dropped.

Shock and vibration resistant radio circuits

Sophisticated frequency synthesis circuits ensure shock and vibration resistance characteristics surpassing today's market standards.

1/2 - Flexible open-ended system

Sites implementing a large number of remote controls require a high number of frequencies. The JAY 400 MHz UP product line features:

- 64 frequencies (for use in France, Belgium and the Netherlands),
- 12 frequencies (for use in the United Kingdom)
- transmit power of 1 mW.

This combination ensures high transmission quality and transmit power control while avoiding unnecessary radio space congestion.

Configurable frequency at worksite

As your needs evolve or during the commisioning procedure, the transmit frequency can be reprogrammed to adapt the UP system to your new conditions. The frequency can be reconfigured by a maintenance technician experienced in electronic circuits.

• Radio approvals:

- United Kingdom:	**RA 12340**
- France:	**960447PPLO**
- Belgium:	**RTT/TI/X071**
- The Netherlands:	**NL 96061170**

• Our systems meet European Directives requirements relative to:

- Machines

- Electromagnetic compatibility

CE type examination certificate nb: CR 96-5015 and CR 96-5016 EMITECH

- Low voltage

TÜV CERT EN ISO 9001 Certificat: 71 100 6 072

JAY électronique

E 213 0397

Safety features 2

The UP remote control systems are designed to meet the requirements specified in the most recent European Machinery Directive 89/392/CEE covering control devices.

2/1 - UP series features:

◆ Uninterrupted radio link.
The UP systems are non-directional and insensitive to obstacles. Operator safety hazards during tricky maneuvers and movements are thus reduced to the minimum.
◆ Each transmitter/receiver is individually coded.
◆ System design features are provided to handle such problems as high interference.
◆ Start-up sequences, a keyswitch and an orientation panel supplied with the equipment ensure safe operation for experienced and trained users.
◆ Response time of around 100 ms compatible with most equipments' travelling speeds.
◆ A redundant logic Priority stop command (*) inhibiting command transmissions and execution of an operation (see section 2/2).
◆ A safety relay monitors the common line of the output relays (series redundancy safety features). The safety relay is switched when the Priority stop (*) palmswitch is pressed.
◆ In addition to the above safety features, the UP remote control systems integrate a number of other features increasing safety both when starting up and when operating the system. These include:
- a «transmission in progress» indicator
- an electric «counter-acting command» inhibit system (for example, up/down commands).
- a «Dead man» feature: This function shuts down the receiver when no command has been received after 4 minutes. In the four minutes which follow, if no pushbutton has been pressed or no other command has been generated, a new startup procedure must be performed to enable generating new commands.
Note: on the 12-button transmitters, the last 4 buttons have no effect on the «dead man» feature. In certain cases, it may be useful to activate one of the first 7 buttons («on» button, for example).
- battery alarm indicator light.
- during maintenance procedures: the UPE transmitter is inhibited when the housing is opened.
- protection against power supply cut-outs of less than 1 second.
- equipment protection by fuse (fuse on common line of relays, and power supply).

2/2 - Priority stop sequence:

An active command is instantaneously generated when the emergency stop palmswitch is pressed (active Priority stop). This command is confirmed (ensuring command redundancy) by cut-out of the transmitter power supply. The transmitter stops transmitting, ensuring complete stop, (passive Priority stop).

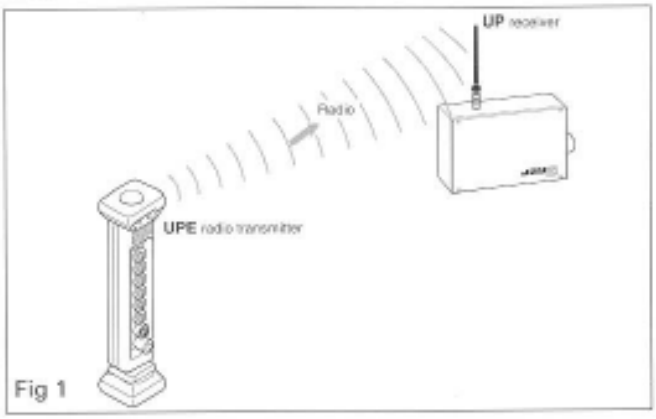


Fig 1

With each of these commands (active and passive), the receiver de-energizes the series-connected control relay and safety relays (operation execution inhibit redundancy).

Operating guidelines 3

Getting the most from your system

3/1 - Command circuit wiring

At the UPR outputs, the commands controlling movements in opposite directions (up - down, for example) can be used either as independent contacts (example: terminals 1 and 3), or as interlocked outputs (example: terminals 2 and 4).
We recommend the interlocked outputs. The independent outputs are reserved for applications other than lifting. The installation and commissioning engineer should however check the possible usefulness of simultaneously implementing counter-acting outputs.
When inhibiting counter-acting commands in a context where the safety factor or the value of the transported loads is high, and regardless of the type of output implemented, two interlocking contactors should be used in the power relay circuits.

3/2 - Choice of frequencies

The UP product line is available with 12 frequencies for the United Kingdom and with 64 frequencies for France, Belgium and the Netherlands (see list on page 10). For sites with several cranes, different frequencies must be used for each crane (be sure not to use the same frequency for two receivers located within 1000 meters of each other). The frequency can be changed on the worksite.

3/3 - Installation of antennas

The simplest rule consists in installing antennas perpendicular to the metal surfaces and as far away as possible from these surfaces. The antenna can be mounted clear of the metal surfaces using the 2 m extension cable and the antenna mounting bracket supplied with the receiver.

3/4 - General rules when using the UP systems

Refer to the applicable rules:
◆ Electromagnetic Compatibility: The UP systems are designed to fully satisfy the EMC Directives and applicable requirements in this area.
- The user must eliminate interference at the source. For this purpose, each remote control is supplied with a set of 3 capacitors (for example, to eliminate interference on the slidding contacts of travelling cranes).
- If an unacceptable malfunction is observed, the relay coils should be fitted with interference suppression devices (per EMC Directives).
◆ Concerning the Low Voltage Directive, ensure that the grounding lines are properly connected to ground when the system is stopped or in motion.
◆ Concerning the EEC Machinery Directive, in addition to ensuring that users have been properly trained in the safety rules and practices, ensure that:
- startup of a lifting device is always indicated by an audible signal (horn or buzzer) or a light signal (rotary flashing lights),
- the direction panel supplied with each unit is properly aligned and visible under the crane. The panel is used to identify the direction of movement controlled from wherever the operator is standing by means of a set of coloured arrows matching the colours of the pushbuttons.
- the remote control population is perfectly supervised and under control through use of the keyswitches in particular.

(*) **Note :** The «Priority stop» designation comes from the «Normal Stop» section of the EEC Machinery Directive. The usual term used in the industry is «Emergency stop». Within the scope of the Machinery Directive, an «Emergency stop» device is not required when the same function is ensured by a «normal» stop device.

Design features and performance ratings 4

4/1 - UPR receiver
(10 channels with 8-button transmitter, 16 channels with 12-button transmitter)

Physical characteristics and climatic withstand capacity		
Housing, protection rating		Aluminium, IP55, IK08 (according to EN 50 102)
Mounting system		By 4 insulating shockmounts secured by M6 screws
Connection with equipment		◆ For Faston terminals, 6.35 mm ◆ Cable lead-in: 2 cable glands PG29 / CM24 for 18 to 25 mm dia. cables PG7/CM6 for 3 to 6.5 mm dia. cables
Weight		3 kg
Operating temperature range		– 20 to + 50 °C
Storage temperature:		– 40° C to + 85° C
Radio characteristics		
Frequency		Programmable by micro-switches on reception tuner
Receiver antenna connector		BNC type, 50 ohm.
Antenna		Sheathed flexible whip antenna supplied with 2 m cable and mounting bracket
Tuner		Frequency synthesis UHF. See available frequencies on page 10
Sensitivity		Better than 1 µV
Electrical characteristics		
Power supply	Voltage	◆ 24, 48, 115, 230 VAC ± 20 % ◆ 12 VDC + 20 % - 10 % ◆ 24 V DC + 20 % - 15 %
	Power consumption	◆ Receiver on standby: 9 VA ◆ Receiver in operation: 16 VA max.
Outputs	Control	◆ 10 relays (8-button transmitter) or 16 relays (12-button transmitters) with 2 NO contacts and common line cut-off via a safety relay and protected by a fuse. The common line can be seperated by 4 independent commons (see schematic Fig.7 page 8) **Relay characteristics** - categories: AC15 3 A/ 250 VAC DC13 2 A/ 24 VDC - maximum current: make 15 A / hold 8 / break 8 A max., - acceptable voltage: 250 VAC max. - maximum breaking power: 2000 VA, - service life: 8 A/250 V AC - cos φ = 0.8 : 10^5 operating cycles, - service life: 0.3 A/230 V AC - cos φ = 0.75 (usual contactor such as CA2-D Telemecanique) 2.10^5 operating cycles.
	Response time	◆ Channels 1 to 16: 100 ms average ◆ Priority stop: average : 220 ms ; maximum 300 ms
	Safety	◆ 1 safety relay R17 with contact series-connected with common line of control contact.
Signaling		1 red indicator light indicating radio link is established
Protection	Power supply	2 fuses
	Contact common line	1 5 A/250 V fuse
	Control contacts	275 V VDR
Dielectric strengh:		> 1500 V AC (1min) : In accordance with EN 947-5-1

4/2 UPC charging unit

	Standard charger	**Fast charger**
charging time:	< 16 h hours	< 1 hour
Weight - protection rating	2.9 kg - IP52 - (fastening: see page 7)	3.6 kg - IP52 - (fastening: see page 9)
Power supply	110 V AC, 230 V AC, 24 V DC ± 20% class 2 - double insulation consumption: 3.5 VA (AC) - 100 mA (DC)	110 V AC, 230 V AC. class 2 - double insulation consumption: 11 VA max
Operating temperature range	0°C to + 50 °C	0 to + 50° C
Stocking temperature:	- 40° C to + 85° C	- 40° C to + 85° C
Dielectric strengh:	2000 V AC (1min) in compliance with EN 60 947-5-1	2000 V AC (1min) in compliance with EN 60 947-5-1

4/3 UPE transmitters (8 and 12-button units)

Physical characteristics and environmental withstand capacity	
Housing	◆ Yellow polypropylene, through-coloured ◆ Foam shock absorbers at housing ends ◆ IP 65 ◆ Shoulder strap
Buttons	◆ Average service life: 1 million operating cycles ◆ 8 and 12-button versions
Operating temperature range	- 20 °C to + 50 °C
Stocking temperature	- 30 °C to + 70 °C
Battery charging temperature range	0 to 50 °C
Weight	8-button unit: 1.6 kg - 12-button unit 2.1 kg
Functional characteristics	
	◆ 6 functions, each controlled by a two-level pushbutton (low/high speed) ◆ 1 "On" pushbutton ◆ 1 "Priority stop" locking palmswitch ◆ 1 «On/Off» keyswitch
Electrical and radio characteristics	
Power supply	Ni-Cad battery
Self-contained operation	◆ 8 hours with continuous transmission
Transmit module	Frequency synthesis technology - programmable by micro-switches
Transmit power	< 1 mW (license exempt)
Average range	50 m in unobstructed space (1)
Transmit frequency	UHF (see list of frequencies on page 10)

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

12-button transmitters

With the 12-button version, 6 additional channels are available. The first 8 pushbuttons are similar to those of the basic model.
The additional 4 buttons are supplied, on request, either as momentary pushbuttons or as rotary switches providing a number of combinations (see table below).

Unless otherwise specified, the unit is supplied equipped with 4 pushbuttons.

12-button transmitter references:
Associate the button code to its physical position

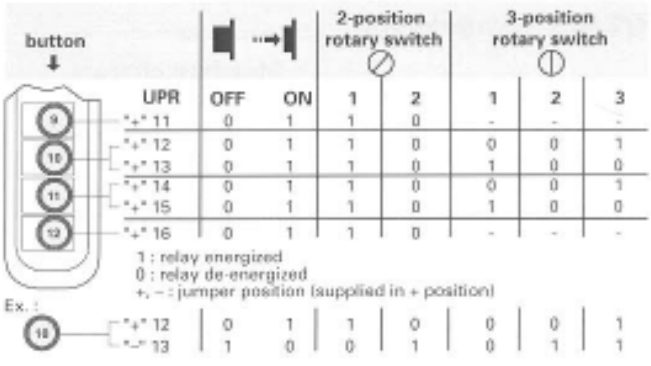
	9	10	11	12	← physical position, button no.
UPE . . . . . /	x	x	x	x	← button code (0 to 9)

Cross-reference between UPR receiver relays and UPE transmitter buttons.

◆ buttons 1 to 8: see next page
◆ buttons 9 to 12: the table below matches the relay positions with the pushbutton positions (factory configuration). Relay operation can be reversed by changing the jumper positions.

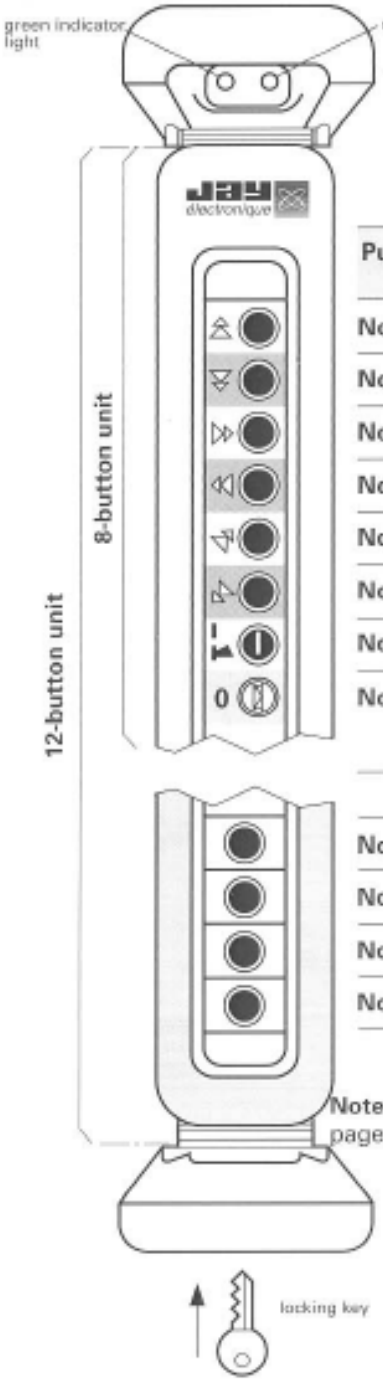
Note : In compliance with the EEC Machines Directive, fixed-position rotary switches cannot be used to control movements representing a safety hazard.

Button code	Button type	Possible locations
0	Blanking cap	9 to 12
1	BLACK pushbutton	0 to 12
2	YELLOW pushbutton	0 to 12
3	RED pushbuttons	0 to 12
4	Keyless locking EMERGENCY SHUTDOWN palmswitch	12
5	Rotary switch with 2 fixed positions	9 to 12
6	Rotary switch with 3 fixed positions	10 and 11
7	Rotary switch with 2 fixed positions + 458A key	9 to 12
8	Rotary switch with 3 fixed positions + 458A key	10 and 11
9	Rotary switch with 3 automatic return positions	10 and 11



Transmitter functions

The table below indicates the Functions of each pushbutton with the unit powered up.



Display:
- Green indicator light: on / transmitting
- Red indicator light: battery alarm

Audible warning signal (buzzer)
- Standby for operation
- Battery alarm
- "Dead man" function

Pushbuttons	Function	Active position	Speed	UJD relay
No. 1 black	Up	1 2	Low (UP-LS) High (UP-HS)	Relay 1 Relays 1 and 3
No. 2 black	Down	1 2	Low (DN-LS) High (DN-HS)	Relay 2 Relays 2 and 3
No. 3 green	Travel right	1 2	Low (TR-LS) High (TR-HS)	Relay 4 Relays 4 and 6
No. 4 brown	Travel left	1 2	Low (TL-LS) High (TL-HS)	Relay 5 Relays 5 and 6
No. 5 yellow	Transl. forward	1 2	Low (TF-LS) High (TF-HS)	Relay 7 Relays 7 and 9
No. 6 blue	Transl. backward	1 2	Low (TB-LS) High (TB-HS)	Relay 8 Relays 8 and 9
No. 7 green	On + horn	pressed in		Relay 10
No. 8 red	• switching on..... enabled • priority stop.....	button out pressed in		Relay 17
No. 9				Relay 11
No. 10				Relays 12 and 13
No. 11				Relays 14 and 15
No. 12				Relay 16

Note : If buttons 9 to 12 are rotary switches, refer to the bottom of the previous page for cross-referencing with respect to UPR relays 11 to 16.

Buttons 9 to 12 on the transmitter have no effect on the «Dead man» function (see section 2/1).

Fig. 2

Note: To facilitate identification of travel and translation controls, a direction panel with coloured arrows matching the colours of the transmitter's pushbuttons is supplied with the unit (flexible adhesive panel (40 x 40 cm) placed under crane).

Starting the transmitter:

After turning the key, release pushbutton No. 8 (priority general shutdown).

Relay 17 will only be energized after pressing the «On» pushbutton (No. 7) once the green indicator light has come on.

Connections 5

5/1 - Power supply

2 of the system units must be connected to an external power source:

◆ UPR receiver

◆ Charging unit for UPC transmitter. The charging unit is connected to a 230 VAC (standard - class 2) source with double insulation (not requiring connection to ground).

The system is supplied with a 2 m cable fitted with a European standard 2-pole mains supply plug connector.

5/2 - Pin identification

UPR wiring diagram

The information plate inside the unit contains all the information you will need for UPR wiring.

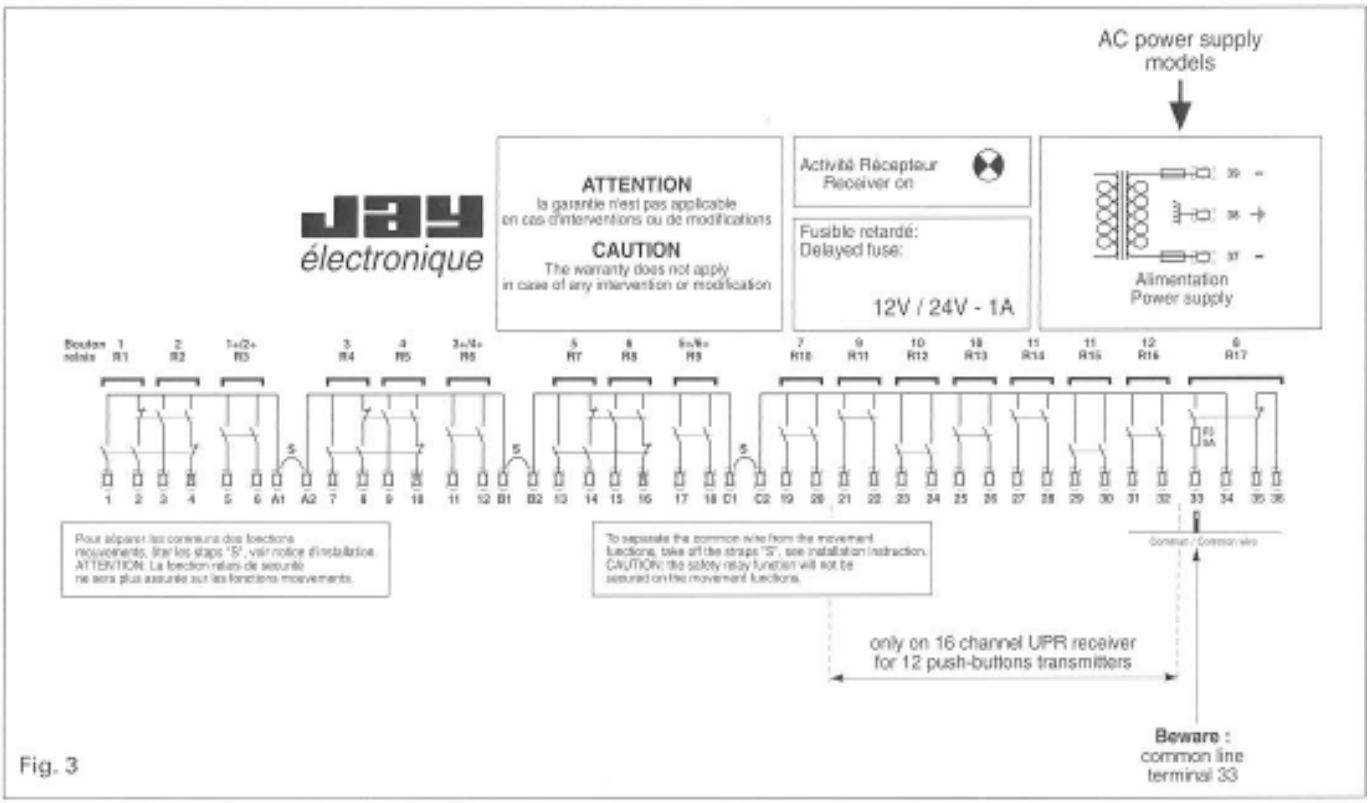


Fig. 3

Fig. 4

5/3 - Example of wiring for UPR

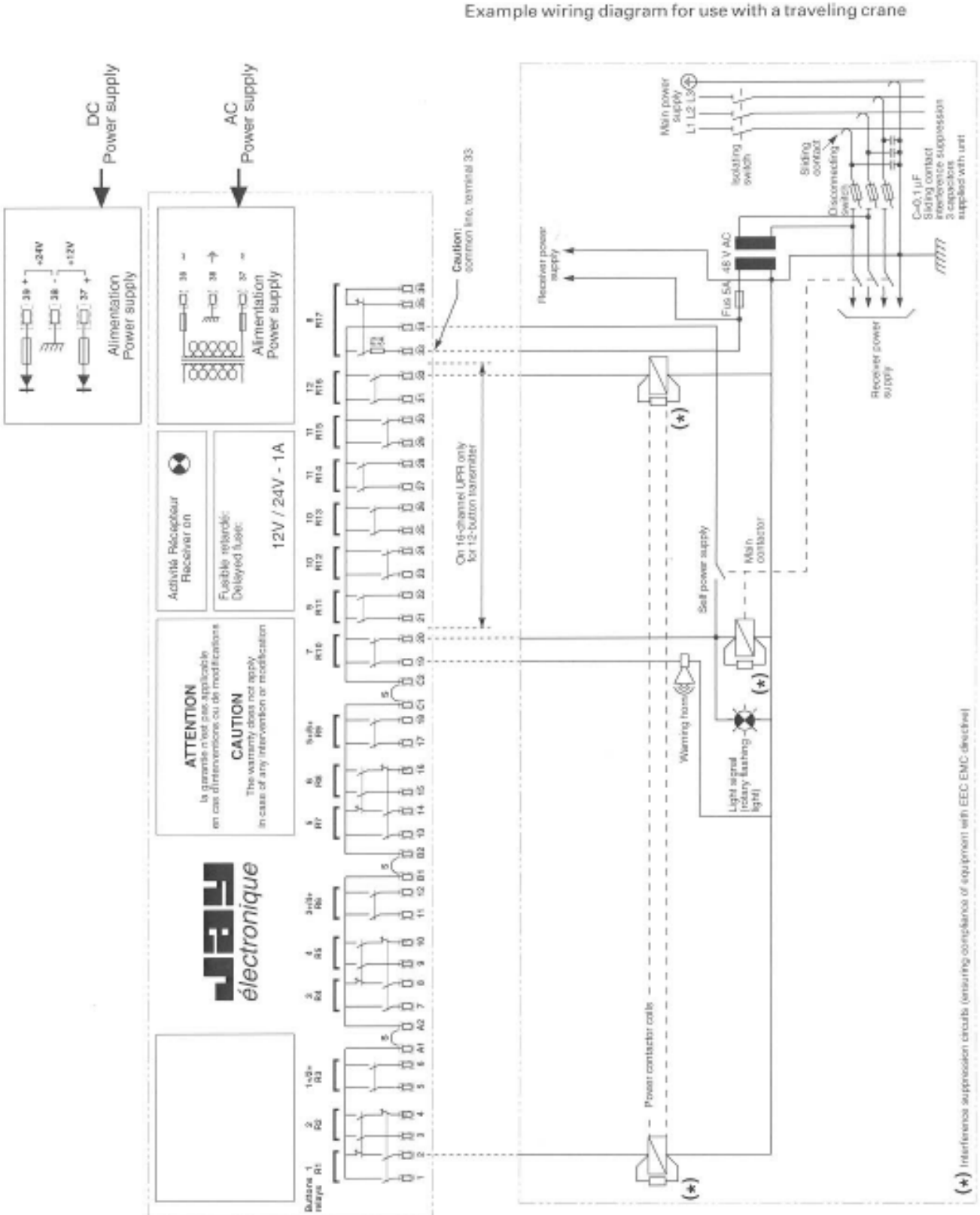


Fig. 5

5/4 - Note on seperate common lines

■ The receivers UPR starting with serial number 350 can be used with 4 contact groups with seperate common lines:
These receivers have the same terminal numbers as the UGR receivers

• Old versions: UPR (and UGR receivers)

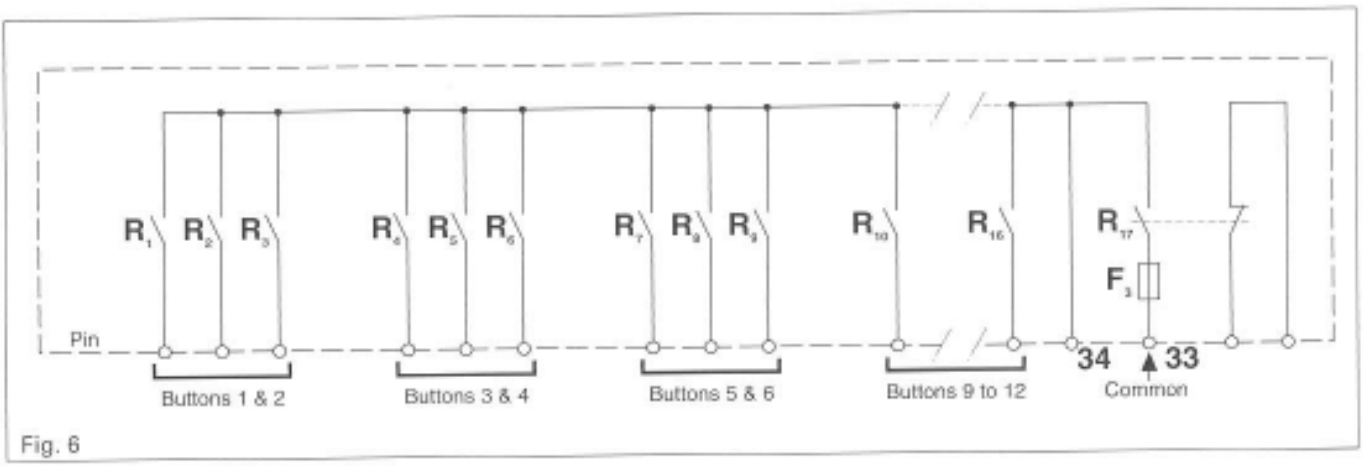


Fig. 6

• New versions

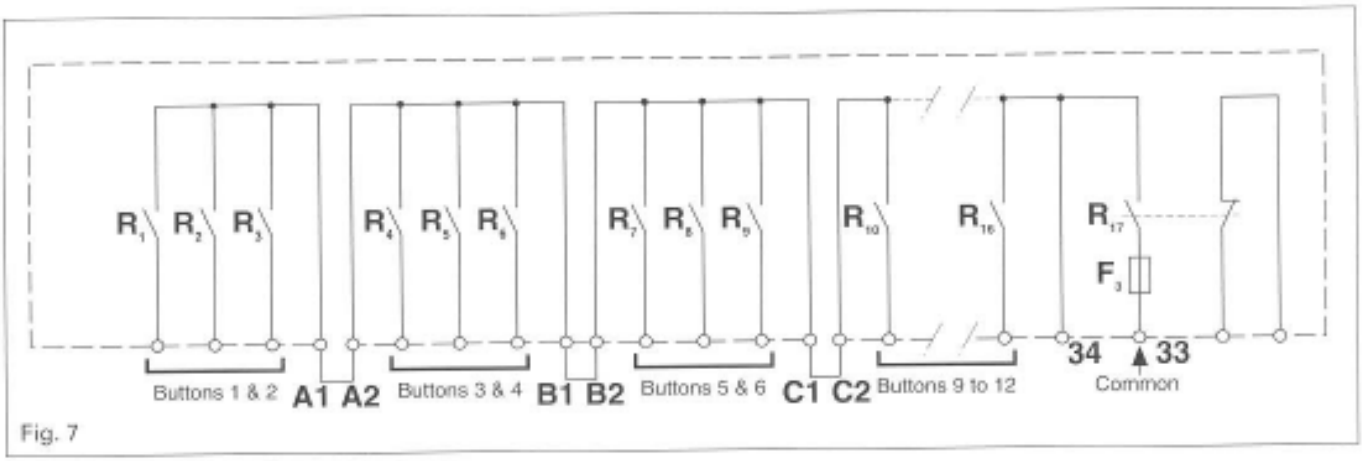


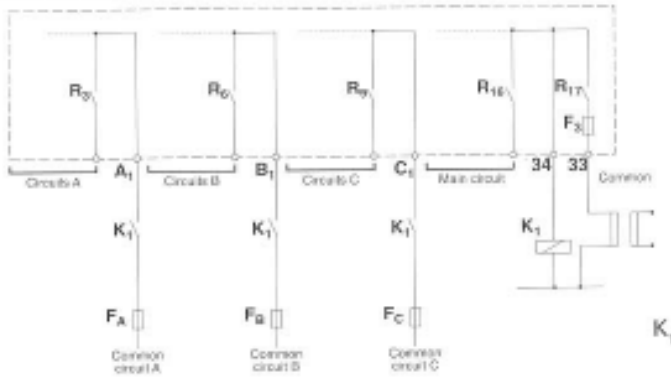
Fig. 7

In order to seperate the common lines, the links A1-A2, B1-B2, C1-C2 must be removed

Beware, if the commons are seperated, it is the responsibility of the user to ensure the safety circuit cut-off, of the new created common lines, from relay R17. See Fig.8

If the common lines are seperated, they are no longer protected by the fuse F3. The user will thus have to ensure the protection of the other common lines. See Fig. 8.

Wiring example

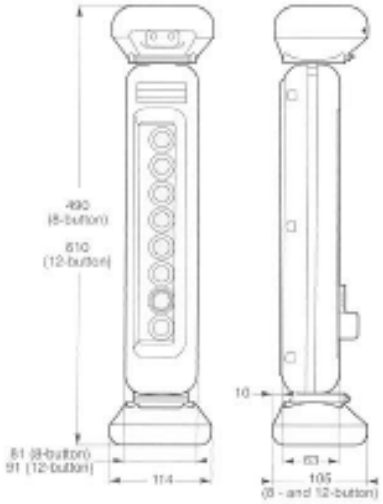


K_1 Safety relay- Priority stop

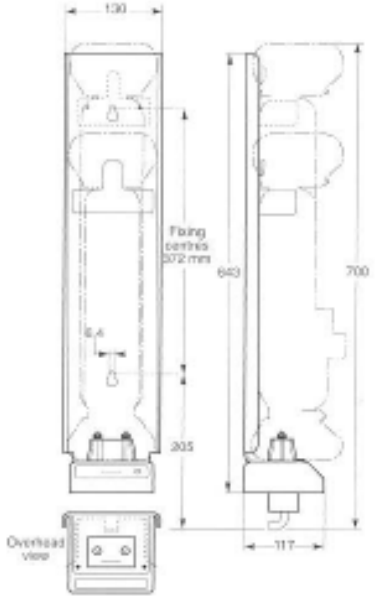
Fig. 8

Dimensions

6/1 UPE transmitter

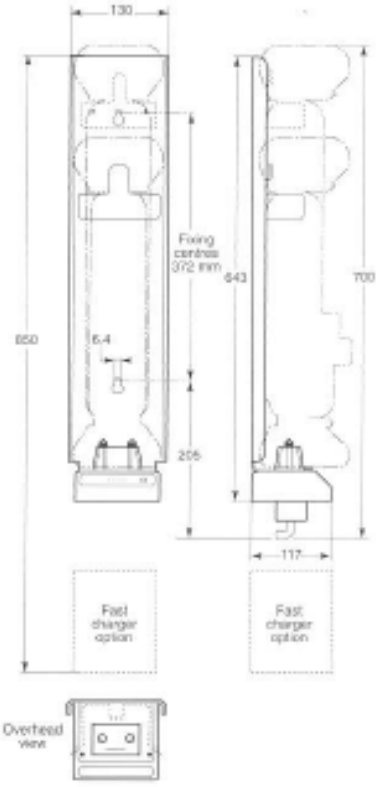


6/2 Wall-mounted UPC00 standard charger

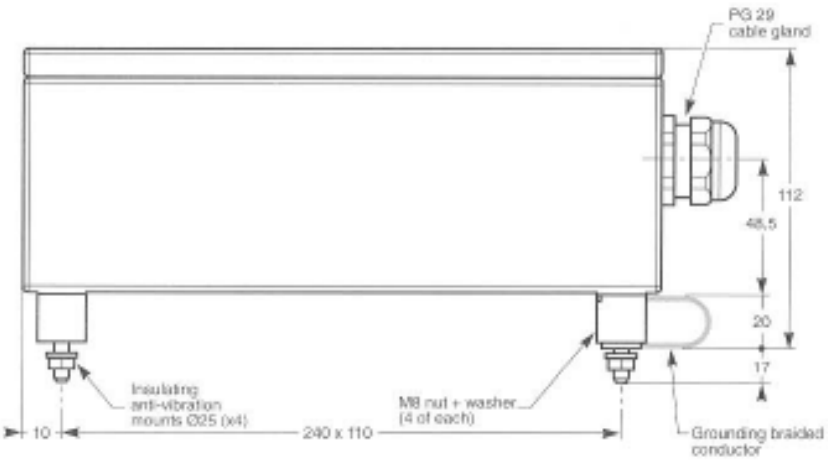


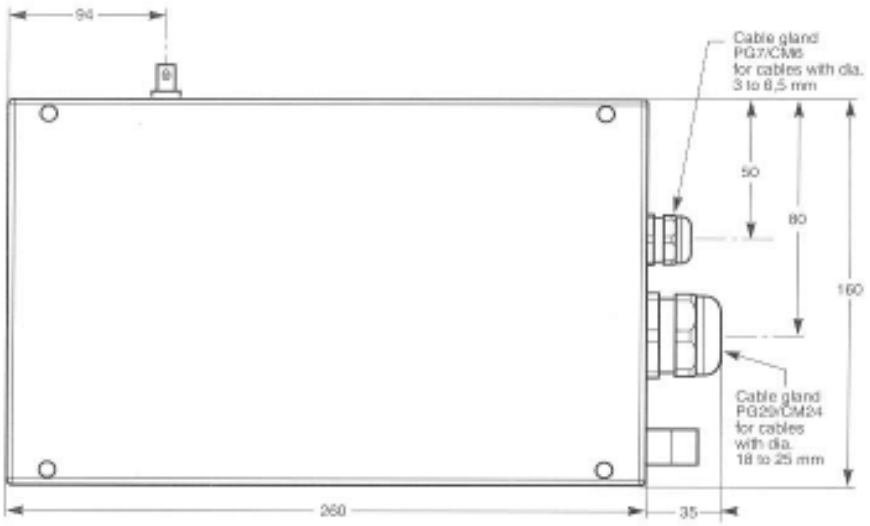
6/3 Wall-mounted UPC0S fast charger

A mounting template is supplied with the charger



6/4 UPR receiver





Frequency selection guide 7

7-1 - List of available frequencies authorised in the United Kingdom

Code freq.	Freq. MHz
G01	458.5125
G03	458.5375
G05	458.5625
G07	458.5875
G09	458.6125
G11	458.6375
G13	458.6625
G15	458.6875
G17	458.7125
G19	458.7375
G21	458.7625
G23	458.7875

List of available frequencies. List of 64 available frequencies authorised in France, Belgium and the Netherlands. (For other countries please contact us)

Code freq.	Freq: MHz
F01	433.1000
F02	433.1250
F03	433.1500
F04	433.1750
F05	433.2000
F06	433.2250
F07	433.2500
F08	433.2750
F09	433.3000
F10	433.3250
F11	433.3500
F12	433.3750
F13	433.4000
F14	433.4250
F15	433.4500
F16	433.4750

Code freq.	Freq. MHz
F17	433.5000
F18	433.5250
F19	433.5500
F20	433.5750
F21	433.6000
F22	433.6250
F23	433.6500
F24	433.6750
F25	433.7000
F26	433.7250
F27	433.7500
F28	433.7750
F29	433.8000
F30	433.8250
F31	433.8500
F32	433.8750

Code freq.	Freq. MHz
F33 (1)	433.9000
F34 (1)	433.9250
F35 (1)	433.9500
F36	433.9750
F37	434.0000
F38	434.0250
F39	434.0500
F40	434.0750
F41	434.1000
F42	434.1250
F43	434.1500
F44	434.1750
F45	434.2000
F46	434.2250
F47	434.2500
F48	434.2750

Code freq.	Freq. MHz
F49	434.3000
F50	434.3250
F51	434.3500
F52	434.3750
F53	434.4000
F54	434.4250
F55	434,4500
F56	434.4750
F57	434.5000
F58	434.5250
F59	434.5500
F60	434.5750
F61	434.6000
F62	434.6250
F63	434.6500
F64	434.6750

(1) Congested frequency, to be avoided in France

Note : As specified on page 1, the transmit frequency can be changed.

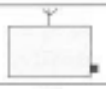
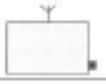
The frequency reconfiguration procedure is detailed in the installation manual.

7/2 Order codes

●●● frequency code (see section 7/1)
▲ charger supply voltage.
V = 110 V AC U = 230 V AC 2 = 24 V DC
□ receiver supply voltage.
R = 24 V AC T = 110 V AC 2 = 24 V DC
S = 48 V AC U = 230 V AC 4 = 12 - 24 V DC.

◆ Complete systems

Comprising transmitter + receiver + charger

Ref.	Number of buttons	UPE transmitter	UPR receiver	UPC charger
UP1 ●●●▲□	8			Standard 
UP2 ●●●▲□	12			
UP3 ●●●▲□	8			Fast 
UP4 ●●●▲□	12			

◆ Separate components

Transmitters	
UPE ●●● 1	8-button transmitter
UPE ●●● 2	12-button transmitter
Charging units	
UPC 0 ▼ 0 0 U	Wall-mounted charger for 8 and 12-button transmitters - 230 V AC
UPC 0 ▼ 0 0 T	Wall-mounted charger for 8 and 12-button transmitters - 110 V AC
UPC 0 ▼ 0 0 2	Wall-mounted charger for 8 and 12-button transmitters - 24 V DC

●●● frequency code (see section 7/1) ▼ O = standard charger S = fast charger

Receivers	
UPR ●●● AU	for 8-button transmitter - 230 V AC
UPR ●●● AR	for 8-button transmitter - 24 V AC
UPR ●●● AS	for 8-button transmitter - 48 V AC
UPR ●●● AT	for 8-button transmitter - 110 V AC
UPR ●●● A4	for 8-button transmitter - 12-24 V DC
UPR ●●● BU	for 12-button transmitter - 230 V AC
UPR ●●● BR	for 12-button transmitter - 24 V AC
UPR ●●● BS	for 12-button transmitter - 48 V AC
UPR ●●● BT	for 12-button transmitter - 110 V AC
UPR ●●● B4	for 12-button transmitter - 12-24 V DC

◆ Accessories

Accessories (supplied with units)	
UJW E 1000	Shoulder strap
VUB 084	400 MHz antenna
VUB 100	Antenna 2 m extension lead

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jay électronique

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