**Solutions for
Hydraulic and
Mobile Machinery**

# DYNAMIC Series

autec®

# DYNAMIC Series

Autec's DYNAMIC Series consists of joystick transmitting units and their receivers, suitable for continuous-current applications typical of hydraulic machines used in construction environments, logistics, transport, infrastructure maintenance and much more.

## Strengths

- Performance of the STOP function up to PL e cat.4 / SIL 3 classified, according to EN ISO 13849-1 / EN IEC 6206
- Performance of protection against unintended movements from standstill (UMFS) up to PL d cat.3 / SIL 2 classified, in accordance with EN ISO 13849-1 / EN IEC 62061
- Two-way radio communication with dynamic and intelligent search for free channel on a wide band of frequencies
- Fieldbus and serial port interface to better control how data is displayed
- Programmable functions for a wide range of digital and analog applications
- Graphic display that allows visualization of data and machine status

## Safety

The DYNAMIC Series has been designed and certified according to the most recent standards relating to Functional Safety, such as EN ISO 13849-1 and IEC 62061. The transmitting and receiving units communicate through a proprietary Autec code which is not reproducible. The STOP function and protection from unintended movements from standstill (UMFS) have been certified by TÜV SÜD on several DYNAMIC Series models. A certification issued by an independent, competent and recognized third party is a further guarantee of safety, quality and reliability of a product.



## FSA technology

The use of Autec FSA Technology allows bi-directional communication in which the radio constantly scans the frequency band used. The process is repeated automatically several times per second without interruption. This makes the radio link more secure, without the need of frequency mapping and allows for a fast and precise response to the proportional controls.

## Configurability

Machine control can be very complex, but one of the main strengths of the DYNAMIC Series is the ability to customize the remote control system. Displays, LEDs for feedback, optional boards for receivers to expand the number of commands, an infrared sensor, serial ports and CAN communication protocol are just some examples of how the needs of countless applications can be met.

# Joystick Transmitting Units

The proportional joystick remote controls of the DYNAMIC Series have been developed for typical hydraulic and mobile machine applications. They are available in four different models: FJS, FJL, FJR and FJM. They offer up to 12 analog commands and up to 64 digital commands with the option for data feedback, which allows visualization of the information coming from the machine on a graphic display or via LED panel.

**FJS**

**FJR**

**FJL**

**FJM**

## Main Features

- STOP function complies with EN ISO 13849-1 / EN IEC 62061
- UMFS protection complies with EN ISO 13849-1 / EN IEC 62061
- Two-way radio communication with dynamic search of free frequency
- Fieldbus and serial interface (CAN / CANopen)
- Extractable external batteries in either NiMH or Li-Ion
- Extractable key ID 0-1 or mechanical key to start-up
- Typical working range 100 m
- Protection degree IP 65
- Customizable command panel
- Up to 12 analog and 64 digital commands
- FJS: 2 joysticks, up to 7 actuators plus START and STOP
- FJL: 4 or 6 analog levers and up to 6 actuators plus START and STOP
- FJR: up to 6 joysticks and numerous actuators plus START and STOP
- FJM: up to 8 joysticks and numerous actuators plus START and STOP

## Accessories

- Shoulder strap
- Waist belt
- Deluxe support belt for FJM with 4.3" display

## Options

- 1.54" graphic display (FJS and FJL)
- 2.7" LCD transflective display (FJR and FJM)
- 4.3" color display (FJR and FJM)
- 32-LED matrix (FJR and FJM)
- LEDs on panel
- Cable control
- Tilt or impact sensor (for FJR and FJM, only with HIC commands expansion board or 4.3" display)
- IR Sensor
- External buzzer
- 3-axis joystick
- ID internal tx memory (if Key ID 0-1 is not present)
- Marine environment protection

## Actuators

- Potentiometer
- Rotative switch
- Selector lever
- "Pull-up" selector switch
- Side button

# FJB Joystick Transmitting Unit

FJB is proposed for applications in harsh environments. It is highly configurable, with a large number of commands and great sturdiness, as usual on Autec products. This joystick transmitting unit is easy to use, thanks to a portability system specially conceived to support the operator, and offers up to 12 proportional commands and up to 64 digital commands with data feedback option that allows viewing of machine information on a 4.3" color graphic display or through LEDs on panel.



FJB

## Main Features

- STOP function up to PL e, cat. 4 / SIL3 complies with EN ISO 13849-1 / EN IEC 62061
- UMFS protection up to PL d, cat.3 / SIL2 complies with EN ISO 13849-1 / EN IEC 62061
- Two-way radio communication with dynamic search of free frequency
- Extractable Li-Ion battery
- Can be intefaced with all DYNAMIC Series receiving units
- Extractable Key ID 0-1 (O-Ring) or mechanical key to start-up
- Typical working range 100 m
- Protection degree IP 65
- Customizable command panel
- Up to 12 analog and 64 digital commands
- Up to 10 linear joysticks
- Up to 4 two-axis or three-axis joysticks
- Up to 26 actuators on the main face, up to 10 buttons on the top and up to 4 buttons on the bottom on either side
- Up to 12 buttons on the frontal display

## Accessories

- Deluxe support belt for FJB

## Options

- 4.3" color display
- LEDs on panel
- Cable control
- IR Sensor
- Tilt or impact sensor
- External buzzer
- 3-axis joystick
- ID internal tx memory (if Key ID 0-1 is not present)
- Marine environment protection

## Actuators

- Potentiometer
- Rotative switch
- Selector lever
- "Pull-up" selector switch
- Side button

# Receiving Units

### CRS

Base station with pre-wired outputs: 12 analog and 64 digital available via CANopen interface. Cabling with 30-pin connector (male+female). External antenna.

### CRX

Base station with pre-wired outputs: 12 analog and 64 digital available via CANopen interface, 4 MOSFET digital. Cabling options: M12 circular connectors,10-pin reduced plug or cable gland. Internal or optional external antenna.

### ARS

Base station with pre-wired outputs: up to 8 analog (voltage) and 12 analog PWM (6 bi-directional axes), maximum 16 digital, also available via CANopen interface. Cabling with two 30-pin connectors (male). External antenna.

### ARX

Compact base station with pre-wired outputs: up to 8 analog (voltage) and 16 analog PWM (8 bi-directional axes), maximum 16 digital, also available via CANopen interface upon request. Direct wiring on the solenoid valves or with 32, 40, 50 or 72-pin plug. External antenna.

### ARM

Configurable base station with pre-wired outputs: up to 12 analog (voltage) or 24 analog PWM (12 bi-directional axes), up to 64 digital, also available via CANopen interface. Cabling with 32, 40, 50 or 72-pin plug. External antenna.

### ADD

Base station with 16 analog, integrated inputs (voltage or current. Up to 12 analog (voltage) or 24 analog PWM (12 bi-directional axes), up to 64 digital, also available via CANopen interface. Well-suited for a Supervisor / Operator system. Cabling with a 32, 40, 50 or 72-pin plug.

# 1.54" and 2.7" displays

Thanks to bi-directional communication all the transmitting units of the DYNAMIC are able to show messages coming from the machine on a graphic display and/or high-efficiency LEDs. 1.54" displays are installed on the FJS and FJL models, while the FJR and FJM were designed for an LED Matrix or 4.3" or 2.7" display. The latter is available on the LCD transflective version, which is ideal for use in outdoor environments and allows visualization of machine parameters, data and icons of different shapes and sizes.
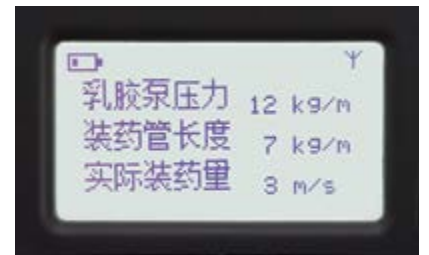






### 1.54" display

- Available on the OLED monochrome version
- 128 x 64 pixel
- Available on the FJS and FJL of Autec's DYNAMIC Series
- Customizable icons and reporting

### 2.7" display

- Available on the LCD transflective monochrome version (for outdoors)
- 128 x 64 pixel
- Available on the FJR and FJM of Autec's DYNAMIC Series
- Customizable layout



# Matrix and LEDs on panel





**Customizable 32-LED Matrix**

**High-efficiency LEDs on panel**

# 4.3" color display

For the FJR, FJM and FJB models of the DYNAMIC Series we have introduced a new 4.3" TFT LCD color display. The display is programmable with CODESYS V3.5 via Ethernet according to international standard IEC 61131-3: this development system is used to program the graphic interface, allowing a wide selection for data representation. With 256 colors and a 480x272-pixel resolution, this new display provides a great visualization of the machine's operating parameters, statuses or other warnings.



FJB

FJM

FJR

## Main features

- 4.3" TFT LCD display
- Sun-readable: great for bright environments
- Viewing angle of the display up to 130°
- Programmable with CODESYS V3.5 via Ethernet (EC 61131-3)
- 6 soft-keys on the top for display navigation and/or other functions
- 6 programmable outputs (1 for external buzzer and 5 for external LED connections)
- Operating temperature: (-25°C)÷(+55°C) / (-13°F)÷(+130°F)
- Storage temperature: (-40°C)÷(+85°C) / (-40°F)÷(+185°F)
- 3-axis accelerometer
- Customizable screens

## Electronics

The internal electronics include data memory of 16 MB. The programming software is CODESYS V 3.5.

## Mechanics

The display is installed directly on top of the FJB, FJM and FJR transmitting units. The tempered and scratch-proof glass screen is encased in a plastic structure with a protection degree of IP 65.

## Graphics

The new display, thanks to its high resolution (480 x 272 pixels, 16:9) and 500 cd/m² brightness can easily be read in very sunny environments. The display can show up to 256 colors.  Proper functioning of the machine is highlighted by 16 LEDs, which can also indicate machine warnings.

# Batteries and chargers



**MBM06MH battery for joystick transmitting units**

- NiMH
- 7.2 V
- 750 mAh
- 5.4 Wh



**LPM02 battery for joystick transmitting units**

- Li-Ion
- 7.4 V
- 1400 mAh
- 10.36 Wh



**LPM04 battery for 4.3" display joystick transmitting units**

- Li-Ion
- 7.4 V
- 2800 mAh
- 20.72 Wh

# Portability



**Shoulder strap**

For the FJS and FJL joystick transmitting units.



**Waist belt**

For the FJR and FJM joystick transmitting units.



**Deluxe support belt for FJM**

For the FJM with 4.3" color display.





**Deluxe support belt for FJB**

Portability system specific to FJB joystick transmitting units.

# Technical data

| General | |
|---|---|
| Frequency Band | 863-870 MHz (128 channels) – 915 MHz (260 channels)<br>447 MHz (32 channels) – 434 MHz (63 channels) – 429 MHz (40 channels) |
| Hamming Distance | ≥15 |
| Typical Working Range | 100 m |
| Safety performance<br>of the STOP function | up to PL e, cat.4 / SIL 3 (EN ISO 13849-1 / EN IEC 62061) |
| Safety category for the protection from unintended movements from standstill (UMFS) | up to PL d, cat.3 / SIL 2 (EN ISO 13849-1 / EN IEC 62061) |
| Protection degree | IP 65 (NEMA 4) |

# Transmitting units

| Joystick | | |
|---|---|---|
| Autonomy with full battery (at 20°C) for FJS and FJL | without display: 18.5 h (LPM02 battery), 11 h (MBM06MH battery)<br>with 1.54" display: 16 h (LPM02 battery), 9.5 h (MBM06MH battery) | |
| Autonomy with full battery (at 20°C) for FJR and FJM | without display: 18.5 h (LPM02 battery), 11 h (MBM06MH battery)<br>with 2.7" display: 15 h (LPM02 battery), 9 h (MBM06MH battery)<br>with 4.3" display: 8 h (LPM04 battery) | |
| Autonomy with full battery (at 20°C) for FJB | with 4.3" display: 8 h (LPM04 battery) | |
| Operating temperature | (-25°C) ÷ (+55°C) | (-13°F) ÷ (+130°F) |
| Storage temperature | (-40°C) ÷ (+85°C) | (-40°F) ÷ (+185°F) |
| Dimensions | **FJS:** 258x170x126 mm<br>**FJL:** 221x170x134 mm<br>**FJR:** 260x200x190 mm<br>**FJM:** 310x210x190 mm<br>**FJB:** 424x211x242 mm | 10.2x7.0x5.0 in<br>8.7x6.7x5.3 in<br>10.2x7.9x7.5 in<br>12.2x8.3x7.5 in<br>16.7x8.3x9.5 in |
| Weight | **FJS:** 1.3 kg<br>**FJL:** 1.4 kg<br>**FJR:** 2 kg<br>**FJM:** 2.5 kg<br>**FJB:** 5.5 kg | 3 lb<br>3 lb<br>4.4 lb<br>5.5 lb<br>12.1 lb |

# Receiving units

| CRS | | |
|---|---|---|
| Power supply | 8-30VDC | |
| Antenna | External, optional 1 or 5 m extension cord | |
| Maximum number of outputs | 12 analog, 64 digital (via CANopen interface) | |
| Rated load of STOP/Safety functions | STP_1 = 8A (30VDC), STP_2 = 8A (30VDC)<br>SAF_1 = 8A (30VDC), SAF_2 = 3A (30VDC) | |
| Operating temperature | (-25°C) ÷ (+70°C) | (-13°F) ÷ (+158°F) |
| Storage temperature | (-40°C) ÷ (+85°C) | (-40°F) ÷ (+185°F) |
| Cabling | 30-pin connector (male + female) | |
| Dimensions | 153x147x55 mm | 6.1x5.9x2.2 in |
| Weight | 500 g | 1.1 lb |

## CRX

| | | |
|---|---|---|
| Power supply | 8-30VDC | |
| Antenna | Internal antenna. External option with 1 or 5 m extension cord | |
| Maximum number of outputs | 12 analog, 64 digital, 4 MOSFET digital | |
| Rated load of STOP/Safety functions | SO_1 = 2A (30VDC), SO_2 = 2A (30VDC) | |
| Rated load of command functions | **Digital outputs:** 2A (30VDC) | |
| Operating temperature | (-25°C) ÷ (+70°C) | (-13°F) ÷ (+158°F) |
| Storage temperature | (-40°C) ÷ (+85°C) | (-40°F) ÷ (+185°F) |
| Cabling | Customizable - possible solutions include M12 circular connector, 10-pin reduced plug, M12 connector (8+5pin), cable gland | |
| Dimensions | 144x162x63 mm | 5.04x5.63x2.48 in |
| Weight | 650 g | 1.43 lb |

## ARS

| | | |
|---|---|---|
| Power supply | 8-30VDC | |
| Antenna | External, optional 1 or 5 m extension cord | |
| Maximum number of outputs | Up to 8 analog (voltage), 12 analog PWM (6 bi-directional axes), max 16 digital, also available via CANopen interface | |
| Rated load of STOP/Safety functions | STP_1 = 7.5A (30VDC), STP_2 = 7.5A (30VDC)<br>SAF = 7.5A (30VDC) | |
| Rated load of command functions | **Analog outputs:** 2A (30VDC) - PWM / 10mA (28VDC) - voltage<br>**Digital outputs:** 2A (30VDC) | |
| Operating temperature | (-25°C) ÷ (+70°C) | (-13°F) ÷ (+158°F) |
| Storage temperature | (-40°C) ÷ (+85°C) | (-40°F) ÷ (+185°F) |
| Cabling | Two 30-pin connectors (male) | |
| Dimensions | 189x184x61 mm | 7.71x8.3x2.4 in |
| Weight | 850 g | 1.9 lb |

## ARX

| | | |
|---|---|---|
| Power supply | 8-30VDC | |
| Antenna | External, optional 1 or 5 m extension cord | |
| Maximum number of outputs | Up to 8 analog (voltage) and 16 analog PWM (8 bi-directional axes), max 16 digital, also available via CANopen interface | |
| Rated load of STOP/Safety functions | SO_1 = 2A (30VDC)<br>SO_2 = 2A (30VDC) | |
| Rated load of command functions | **Analog outputs:** 2A (30VDC) - PWM / 10mA (28VDC) - voltage<br>**Digital outputs:** 2A (30VDC) | |
| Operating temperature | (-25°C) ÷ (+70°C) | (-13°F) ÷ (+158°F) |
| Storage temperature | (-40°C) ÷ (+85°C) | (-40°F) ÷ (+185°F) |
| Cabling | Customizable – direct wiring on the solenoid valves; 32, 40, 50 or 70-pin plug | |
| Dimensions | 240x186x83 mm | 7.95x4.84x3.23 in |
| Weight | 1.2 kg | 2.7 lb |

## ARM

| | | |
|---|---|---|
| Power supply | 8-30VDC | |
| Antenna | External, optional 1 or 5 m extension cord | |
| Maximum number of outputs | Up to 12 analog (voltage) or 24 analog PWM (12 bi-directional axes), up to 64 digital, also available via CANopen interface | |
| Rated load of STOP/Safety functions | STP_1 = 7.5A (30VDC), STP_2 = 7.5A (30VDC)<br>SAF_1 = 7.5A (30VDC), SAF_2 = 3A (30VDC) | |
| Rated load of command functions | **Analog outputs:** 2A (30VDC) – PWM / 10mA (28VDC) - voltage<br>**Digital outputs:** 4A (30VDC) | |
| Operating temperature | (-25°C) ÷ (+70°C) | (-13°F) ÷ (+158°F) |
| Storage temperature | (-40°C) ÷ (+85°C) | (-40°F) ÷ (+185°F) |
| Cabling | 32, 40, 50 or 72–pin plug | |
| Dimensions | 185x280x105 mm | 7.9x9.1x3.8 in |
| Weight | 3 kg | 6.6 lb |

## ADD

| | | |
|---|---|---|
| Power supply | 8-30VDC | |
| Antenna | External, optional 1 or 5 m extension cord | |
| Maximum number of outputs | 12 analog (voltage), 24 analog PWM (12 bi-directional axes), 40 digital, also available via CANopen interface | |
| Rated load of STOP/Safety functions | STP_1 = 7.5A (30VDC), STP_2 = 7.5A (30VDC)<br>SAF_1 = 7.5A (30VDC), SAF_2 = 3A (30VDC) | |
| Rated load of command functions | **Analog outputs:** 2A (30VDC) - PWM / 10mA (28VDC) - voltage<br>**Digital outputs:** 4A (30VDC) | |
| Operating temperature | (-25°C) ÷ (+70°C) | (-13°F) ÷ (+158°F) |
| Storage temperature | (-40°C) ÷ (+85°C) | (-40°F) ÷ (+185°F) |
| Cabling | 32, 40, 50 or 72–pin plug | |
| Dimensions | 268x343x110 mm | 9.8x11.4x4.3 in |
| Weight | 3.8 kg | 8.4 lb |

## Optional boards

| | |
|---|---|
| FSAAVO10A | Board with 10 analog outputs (voltage) for ARM and ADD |
| FSAAPO06A | Board with 12 analog outputs PWM (6 bi-directional axes) for ARM and ADD |
| FSADSO16A | MOSFET board with 16 digital outputs for ARM and ADD |
| FSADRO08A/B | Relay board with 8 digital outputs for ARM and ADD |
| FSAAMI01A | Board with 8 analog inputs (current or voltage) and 8 digital inputs; RS 232/485 serial port interface. ARM Receiver only. ADD option for 16 analog inputs without serial port |
| FSAAPO04A | Board with 4 analog outputs PWM (2 bi-directional axes) and 4 MOSFET digital outputs for ARX |
| FSAAMI06A | Board with 6 analog inputs in current or voltage and with CAN output for ARX |
| FSADIA16A | Board with 16 diodes for ARX |

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Cert. UNI EN ISO 9001:2008 No. 50 100 2877 Design, manufacture and service of remote control systems for safety industrial applications.