CONTROL PANEL MODEL FMP "UNI EN 12845 / UNI EN 10779 NORMS STARTER FOR MOTOR PUMP OF FIRE-FIGHTING GROUPS" USER MANUAL – INSTALLATION MANUAL

REV. 2 DATED 08.09.2018

Electronic card with micro-controller CAM – data sheet:

- ✓ Protection fuses for relay and electronics components;
- ✓ AUTO / OFF / MAN operating modality selector switch with key extractable at the position AUTO only;
- ✓ Alpha-numeric, high visibility illuminated blue *LCD* monitor;
- ✓ Automatic and manual *LED* test;
- ✓ Simplified navigation keyboard;
- ✓ 60 Alpha-numeric and graphics characters available;
- Messages at display in three languages (Italian, English, French);
 Programmable by keyboard internal clock and calendar with dis
- Programmable by keyboard internal clock and calendar with display of YEAR / MONTH / DAY of the WEEK / DAY of the MONTH / HOURS / MINUTS / SECONDS;
- ✓ Weekly test directly programmable by keyboard;
- ✓ Weekly test exclusion;
- ✓ Restoring of normal operating modality at the end of weekly test;
- ✓ Restoring of normal operating modality in case of fire during the weekly test;
- ✓ Storage settings on *EEprom* ram memory;
- ✓ Control of input signals with protection against electrics discharges and electrostatics;
- ✓ No-bouncing inputs controlled by software;
- ✓ Very low voltage (5 V) and very low current (< 0,5 mA) inputs;
- ✓ *RS*-485 serial port for alarms sending and resetting to up to 1.500 metres with dedicated control panel *MC*-*PAR*;
- ✓ *I2Cbus* internal serial port for communication with other electronic cards;
- ✓ *In-Circuit* software update;
- \checkmark Possibility of stopping the pump at the restoring of pressure;
- ✓ Programmable number of start attempts;
- Programmable duration of start relay excitation;
- ✓ Programmable duration of pause among start attempts;
- ✓ State indication by means of high luminosity *LED* for:
 - call from pressure switches (START BY CALL PRESS. SWITCH);
 - call from pressure transducer (START BY CALL PRESS. TRANSD.), N.F.P.A. Norms only;
 - Power in (POWER);
 - General alarm (ALARM);
 - MOTOR ON;
 - STARTING FAILURE;
 - SPRINKLER ALARM;
 - TEST ENABLING;
 - PRESSURE SYSTEM;
 - UNLOADING VALVE;
 - AUTOMATIC STOP (UNI EN 10779 Norms only);
 - WEEKLY TEST;
 - RUN;
 - LOW LEVEL STORAGE TANK;
 - LOW LEVEL FUEL TANK;
 - LOW PRESSURE TOWN MAINS;
 - MOTOR HIGH TEMPERATURE;
 - LOW PRESSURE OIL;
 - LOW TEMPERATURE ROOM;
 - BATTERY 1 FAILURE;
 - BATTERY 2 FAILURE;
 - Main power failure (BATTERY 1 FAILURE and BATTERY 2 FAILURE);
 - STOP;
- Messages at display for:



- Date, time (hours, minutes and seconds), norms and key position;
- State of charge of both batteries; _
- Key position;
- Motor stopped;
- Call from pressure switches;
- Call from pressure transducer;
- Call for priming;
- Start for priming;
- Number of starting attempts;
- Length of starting attempts;
- Pause between two starting attempts;
- _ Motor running;
- Starting failure;
- Start with battery 1;
- Start with battery 2;
- Start with batteries 1 and 2;
- Waiting for motor stop;
- Weekly test in progress;
- Fuel level $(0 \div 100\%)$;
- Low Level fuel;
- Oil pressure $(1,0 \div 10,0 \text{ bar});$
- Motor temperature $(10^{\circ}C \div 130^{\circ}C)$;
- Running hours meter;
- Motor RpM.
- ✓ Reset of alarm display;
- Acknowledgement of acoustic alarms;
- \checkmark *START/STOP* by means remote control (not included);

Analogue Inputs:

- ✓ Fuel level $(0 \div 100\%)$;
- ✓ Motor oil pressure $(1,0 \div 10,0 \text{ bar})$;
- ✓ Motor temperature $(10^{\circ}C \div 130^{\circ}C)$;
- ✓ Battery 1 level;
- ✓ Battery 1 level,✓ Battery 2 level.

Digital inputs:

- ✓ No. 2 NC (*Normally Closed*) pressure switches for fire detection;
- ✓ Float switch for priming tank of pump;
- ✓ Flow switch for sprinkler of pump room;
- ✓ Pump room temperature;
- ✓ Low level of storage tank (read *low pressure town mains* in case of supply by town mains);
- \checkmark Storage tank empty;
- System in pressure;
 External start and stop buttons;
- ✓ Low pressure oil pump;
- ✓ High temperature water pump or oil pump;
- ✓ Low level fuel tank;
- ✓ Pick-up for round meter.

Outputs:

Free contacts for:

- a. Type A Alarm;
- b. Type B Alarm;
- c. Pump Running;



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- d. Startin Failure Alarm;
- e. Pressure Switch Call;
- f. Line Fault Or Batteries Fault Alarm;
- g. Flow Switch Alarm;
- h. Pump Room Temperature Alarm;
- i. Acoustic Alarm Acknowledgment;
- j. Resistance of pre-heating;
- k. Automatic Start Disabled Alarm;

MESSA IN SERVIZIO

Il pannello di controllo è testato in azienda e viene fornito completo di dichiarazione di conformità e manuale di istruzioni per l'utente. L'unità di controllo è predisposta per le normative UNI EN 12845, UNI EN 10779 e N.F.P.A. Tuttavia il cablaggio non consente l'utilizzo del pannello di controllo indistintamente con le tre norme. Pertanto il quadro è fornito con il cablaggio e la programmazione idonea al tipo di norma riportata sulla targhetta fronte-quadro <u>Gli ingressi in</u> assenza dei quali il quadro andrebbe in allarme sono ponticellati.



PRELIMINARY OPERATIONS

Before of put in service, make the following preliminary operations:

- put the control panel in proximity of the fire-fighting group or on the test bench;
- open the window and connect the input devices at the relative clamps as indicated in electric layout that accompanies each control panel (in substitution of the bridges, for electrical signals NC Logic Normally Closed. On the free clamps, for electrical signals NO Logic Normally Open);
- connect the batteries respecting the polarity;
 - \checkmark verify that:
 - the *LCD* monitor makes the self-test of correct operation of all segments¹ and, then, that it displays the current version of the SW (default: SOFTWARE V1.2 (C) 2009);
 - all *LED* turn on for 1 sec² (*automatic TEST LED*);
 - the LED *POWER* stays turned on, to display the power supply 12 V
 - the *LED BATTERY 1 FAILURE and BATTERY 2 FAILURE* blinking to indicate the *SUPPLY FAILURE*;
- If not, turn the selector with key to the central position (*OFF*).
- Push the *RESET ALARM* button to delete the possible residual alarms³.
 - \checkmark verify that:
 - the LCD monitor displays *DATE and TIME* on the first line aloft; the LCD monitor displays *SELECTED NORMS and SELECTOR POSITION (P.Off)* on the line in low;
- Make the customizing of the panel with the following modality:
 - ✓ Choose the language . press the SET button repeatedly until you read IMPOSTA LINGUAGGIO;
 - Use the " \leftarrow \rightarrow " buttons to selecting the language between italiano, and Française
 - Push *ESC* to memorize and go out of the menu *IMPOSTA LINGUAGGIO*;
 - ✓ Choose the normative of referring. Push and maintain pushed for 3 sec the button "↑". The *LCD* monitor will visualize the current normative; with a further pressure on the same button we will pass from *UNI 12845* norms at *UNI 10779* norms at *NFPA* norms. When the norm is selected, push the button *ESC* to memorizing and go out of the menu⁴.



¹ In case of low visibility or loss visibility of the LCD monitor, operate on the RV2 trimmer on board of the electronic card until the correct display.

² LED green indicate normal condition of working;

LED red indicate type A alarms, that are alarms for indication of fire or probable fire;

LED yellow/orange indicate type B alarms, that are alarms for indication of trouble of working which could prevent the correct working in case of fire.

The *LED TEST* can be made in any time manually, if the selector switch with key is on position *OFF* pressing the *TEST* button on board of the synoptical panel.

 $^{^{3}}$ UNI EN 12845 norms contemplate that all the signals of alarm that cause the starting of the pump also persist in case of lack of the cause that has provoked it. The reset of the alarm must have done manually by means intervention of a operator and with the key on position *OFF*.

WARNING! No one type of alarm, of anomaly or of malfunction can cause the arrest or the missed starting of the pump.

⁴ In any menu, if you don't make some action within 20 seconds you will go out of the menu, returning to the situation of stand-by.

- ✓ Push *SET* six time until you read *menu ADJUST CLOCK*;
 - Push the button ENT to enter in menu ADJUST CLOCK (directly into the field YEAR);
 - Use the " $\leftarrow \rightarrow$ " buttons to selecting the current year;
 - Push the button *SET* to memorize the value and pass to the field *MONTH*;
 - Use the " $\leftarrow \rightarrow$ " buttons to selecting the current month;
 - Push the button *SET* to memorize the value and pass to the field *DAY of the MONTH*;
 - Use the " \leftarrow \rightarrow " buttons to selecting the current day of the month;
 - Push the button *SET* to memorize the value and pass to the field *DAY of the WEEK*;
 - Use the " $\leftarrow \rightarrow$ " buttons to selecting the current day of the week;
 - Push the button *SET* to memorize the value and pass to the field *HOURS*;
 - Use the " $\leftarrow \rightarrow$ " buttons to selecting the current hour;
 - Push the button *SET* to memorize the value and pass to the field *MINUTS*;
 - Use the " $\leftarrow \rightarrow$ " buttons to selecting the current minute⁵;
 - Push the button *SET* to memorize the value and return to the field $YEAR^6$;
 - Push the button *ESC* to memorize everything and go out of the menu *ADJUST CLOCK*.

READING OF LEVELS AND SIGNALS

- Hold the selector at position *OFF*;
- Make the connection between motor-pump and control panel, without connecting the electrical line, and <u>without connecting the starter-motor</u>. WARNING! REMEMBER THAT THE GROUP IS ABLE TO START HIMSELF BY MEANS THE BATTERIES! OWN EVEN IN THE ABSENCE OF ELECTRIC LINE.
- Supply a minimum of fuel at group;
- Supply oil at group (and water, if any).
 - Push *SET* one time to display the level of charge of batteries;
 - Push *SET* two times to display the level of fuel $(0 \div 100 \%)$. If zero, the panel will indicate the fuel reserve with the turn on of the *LED LOW LEVEL FUEL TANK*;
 - Push *SET* three times to display the level of oil pressure $(1,0 \div 10,0 \text{ bar})$. With the motor stopped, reading is not significative.
 - Push *SET* four times to display the temperature of the motor $(10 \div 130 \text{ °C})$;
 - Push SET five times to display the hours meter (hhhhh:mm $00000:00 \div 99999:99$);
 - Push SET six times to display the menu ADJUST CLOCK;
 - Push SET seven times to display the menu PLANNING TEST⁷;
 - Push ENT to enter in menu PLANNING TEST;
 - The LCD monitor will display *INSERt PASSWORD* 00000.
 - Push the buttons "← →" to select the digit to change. Push the buttons "↑
 ↓" to select the value of the digit (for this model: 30405). Push ENT to enter in menu PLANNING TEST:
 - 1th field: *MINUTS*



⁵ Selecting the current minute, automatically the counter of seconds starts from 0 value. This shrewdness allows the perfect synchronism with a external reference.

⁶ Any menu has a cyclical structure. After the exit from the last programmable field return to the first programmable field. You can go out from a menu with the buttons *ENT*, *ESC* or after 20 seconds without some action.

Warning! Don't make this operation before setting clock to avoid unwanted start attempts.

- Push the buttons " $\leftarrow \rightarrow$ " to select the minute of start⁸;
- Push *SET* to memorize the value and go to the next field.
- 2th field: HOUR
 - Push the buttons " $\leftarrow \rightarrow$ " to select the hour of start;
 - Push *SET* to memorize the value and go to the next field.
- 3th field: DAY OF THE WEEK
 - Push the buttons " $\leftarrow \rightarrow$ " to select the day of the week;
 - Push *SET* to memorize the value and go to the next field.
- 4th field: DURATION TEST
 - Push the buttons " $\leftarrow \rightarrow$ " to select the duration of test (range 1 (0) \div 240 minutes)⁹. If this value is different from zero, verify the turn on of the LED WEEKLY TEST.
 - Push *SET* to memorize the value and return to 1th field (cycle menu).
- Push *ESC* to memorize and exit from menu (also, you don't make any operations for 20 sec).
- Push SET eight times to display SET PARAMETERS.
 - PUSH ENT to enter in menu SET PARAMETERS (after entering password);
 - The LCD monitor will display *INSERt PASSWORD* 00000.
 - Push the buttons "← →" to select the digit to change. Push the buttons "↑
 ↓" to select the value of the digit (for this model: 30405). Push ENT to enter in menu SET PARAMETERS:
 - 1th parameter: NUMBER of STARTING ATTEMPTS.
 - Push the buttons " $\leftarrow \rightarrow$ " to choose the number of starting attempts before that the control panel gives the alarm *STARTING FAILURE* (range 2 ÷ 99; default 6). Push *SET* to memorize the value and go to the next parameter;
 - 2th parameter: BREAK BETWEEN STARTINGS.
 - O Push the buttons "← →" to choose the duration of the break between an attempt and the next (range 3 ÷ 20 seconds; default 15 seconds). Push SET to memorize the value and go to the next parameter;
 - 3th parameter: DURATION of the STARTING.
 - Push the buttons " $\leftarrow \rightarrow$ " to choose the duration of the start attempt (range 2 ÷ 99 seconds; default¹⁰ 6 seconds). Push *SET* to memorize the value and go to the next parameter;
 - 4th parameter *RPM MOTOR RUNNING* (range $300 \div 1000$ rpm).
 - Push the buttons " $\leftarrow \rightarrow$ " to choose the threshold of motor running (defaul 500 rpm). Push *SET* to memorize the value and go to the next parameter;
 - 5th parameter *TEETH FLYWHEEL* (range 10 ÷ 250 default: 100 Lombardini engine for 3000 rpm / steady)¹¹. Choose the value and push *SET* to memorize the value and go to the next parameter;



⁸ The weekly test will be executed if, at the moment of the test, the control panel will be in position *AUTO*, *only*.

⁹ If *DURATION TEST* equal 0 (zero), the weekly test is disabled and the *LED WEEKLY TEST* is turned off.

¹⁰ All the default settings are that indicated in UNI EN 12845 norms.

- Push *DEL* to return to 1th parameter (cycle menu).
- Push *ESC* to memorize and exit from menu (also, you don't make any operations for 20 sec).
- Push SET nine times to enter in menu IMPOSTA LINGUAGGIO;
- Push SET ten times to return in menu ADJUST CLOCK (cycle menu).

Every parameters choosed will be memorized on EEProm memory, except date and time.



¹¹ If you don't know this value, manually you must start the motor- pump. You know the rpm / steady, usually 3000. You choose the *TEETH FLYWELL* until read on the *LCD* monitor 3000 rpm. When the controller will acknowledge the condition of the engine running you will see the *LED RUN* turned on.

PUT IN SERVICE

WARNING!! Make this operation with extreme caution and only by specialized technical personnel. RISK of ELECTRIC SHOCK!!

- Make sure once again that does not persist any state of alarm that could automatically start the pump;
- Connect the motor-pump with the control panel, as so displayed by the electric layout that accompanies every panel;
- Connect the main supply 230 V~ +/- 5%, F+N, 50÷60 Hz;
- Connect, if the pump require it, the resistance of pre-heating to the correspondents clamps *PR* and switch the MCD to the position *ON*;
- Close the door and shift manually the door-interlock selector switch to the position ON.

SELECTOR SWITCH AT POSITION MAN (MANUAL)¹²

Before shift the selector to position MAN, make sure that you are out of any menus. If no, the control panel could work not correctly.

- ✓ Verify that the LCD monitors displays *POSITION MAN* on the first line aloft; *Motor Stopped* on the line in low;
- Push START;
 - ✓ Verify that:
 - 1. the LCD monitor displays *Start Battery 1* (or 2) on the line in low;
 - 2. when the excitation of the motor starter is over, the LCD monitor displays *rpm value* and *POSITION MAN* on the first line aloft; *pressure* and *temperature* on the line in low;
 - 3. when the excitation of the motor starter is over, the LED MOTOR ON turn on
 - 4. when the pump is effectively started the LED *RUN* turn on 13 ;
 - 5. immediately, the *Type* A^{14} alarm (*fire in progress*) turn on, with the closing of the contacts at the clamps 29 and 30;
- If the pump is on, push the button *STOP* to stop it;
 - ✓ Verify that:
 - 6. the *Type A* alarm falls immediately;
 - 7. the LED *STOP* turn on;
 - 8. the LED *MOTOR ON* turn off
 - 9. the LED *RUN* turn off when the pump is effectively stopped 15 ;

¹⁴ Every alarms can be acknowledged (*NOT RESET*) pushing *DEL*.

¹⁵ The electronic card lets the signal of motor running and it gives for 5 sec the signal of stop to the valve of *electrostop*. At fourth second it verifies the effective stop of the pump between the run signal from the pump. If the run signal persists, the *electrostop* remains up for other 5 sec, so as until 30 sec. At the end of 30 sec, to avoid the damage of the



¹² With the selector switch at position MANUAL or 0, the alarms TYPE B ALARM and AUTOMATIC START DISABLED ALARMS are active.

¹³ The LEDS *MOTOR ON* and *RUN*, don't show the same function. The LED *MOTOR ON* show that the control panel maintains the signal of motor running. The LED *RUN* turn on by a signal of return from the motor and it shows that the motor is effectively started. **WARNING!** When the pump is effectively started and the LED *RUN* doesn't turn on, you must operate the trimmer *RV1* on MC-CMA electronic card until you get the correct amplification need for the turning on of the LED *RUN*. After this regulation, if you don't see the rpm of motor, you must operate on pick-up, approaching it to the flyweel until to see the rpm of motor. If the value is not credible, you must change the setting of TEETH FLYWHEEL (please, see the note 11) until you will see the correct value..

<u>WARNING!</u>. If the motor has a W signal instead of pick-up, you must connect it to the clamp 26. In this case the rpm is not significative (the value is function of the number of poles of the alternator). In this case, also, you must set a fictitious number of teeth to get the right value.

- 10. the monitor LCD returns to display *POSIZIONE MAN*. on the first line aloft; *MOTOR STOPPED* on the line in low;
- Push again the button *START*;
 - ✓ Verify all steps from 1 until 10 with second battery;

SELECTOR SWITCH AT THE POSITION AUTO (AUTOMATIC)

✓ Verify that the LCD monitor displays *DAY of WEEK* and *TIME* on the first line aloft; sul rigo in basso *SELECTED NORMS* and *P. Aut.* (position AUTOMATIC) on the line in low.

Simulation of starting from Called By Pressure Switch 1¹⁶:

- Open the contact *pressure switch 1* to the clamps 1 and 2,
 - ✓ Verify that:
 - a) the LCD monitor displays *CALLED by PRESSURE SWITCH*;
 - b) the LED START BY CALL PRESS. SWITCH turn on;
 - c) immediately, the *Type A* alarm (*fire in progress*) turn on, with the closing of the contacts at the clamps 29 and 30
 - d) the contact of alarm at the clamps 35 and 36 *CALLED by PRESSURE SWITCH* is open;
 - e) begin the routine of start attempts so as planned (alternating the batteries and respecting the *time out* between an attempt and the successive);
 - f) the LCD monitor displays the correspondent step of the routine
- To this point the pump will start. Proceed verifying that:
 - g) At the end of the time of excitation of the starters the LCD monitor displays *rpm* and *tipe of call* (in this case *AUTOMAT*) on the first line aloft; oil pressure and motor temperature on the line in low;
 - h) At the end of the time of excitation of the starters the LED *MOTOR ON* turn on;
 - i) the contact of alarm at the clamps 33 and 34 *MOTOR STARTED* is closed;
 - j) at the effective starting of the pump, the LED *RUN* turn on;
- Stop the pump bringing the selector switch with key to the position *OFF*. Jump the following points *k*), *l*), *m*) and *n*).
- After the verification of the point *f*), if the pump dont start, the switchboard will complete the planned number of start attempts and go on in alarm.
 - ✓ Verify that:
 - k) the LED ALARM turn on;
 - 1) the LED *STARTING FAILURE* turn on;
 - m) the contact of alarm at the clamps 37 and 38, *START FAILURE*, is closed;
 - n) the contact of *Type B alarm* (trouble of working) at the clamps 31 and 32, is closed.
- The most probable cause of start failure is the low charge of both batteries. At this point only, the manual start of security will be enabled. This situation will be emphasized with the lighting of the LED *TEST ENABLING*. The starting will make pushing the *TEST* button or the *START*

electrostop, the controller lets fall the signals because there is a problem of stopping. The pump must be stopped manually. This measure is used for any stop of the pump, whatever the cause of the start.

¹⁶ UNI EN 12845 norms contemplate the use of 2 pressure switches for fire in progress calling. The pressure switches must have NC contacts. The opening of one contact causes the start of the pump.



button placed in front of control panel¹⁷. The switchboard will make one or more start attempts with both the batteries in parallel. If the pump won't start, please contact the technical assistance to locate the trouble.

Simulation of starting from Called By Pressure Switch 2:

- Open the contact *pressure switch 2* to the clamps 3 and 4.
- Repeat all the procedure as the pressure switch 1.

Simulation of starting from Called By Float For Priming:

- Open the contact *FLOAT SWITCH PRIMING TANK* to the clamps 5 and 6.
- The control panel will make the routine of start. This situation doesn't cause any alarms. The control panel will display the indication of *CALLED FOR PRIMING* only on LCD monitor.
 - \checkmark When the pump is started, verify that:
 - the LCD monitor displays *FILLING PRIMIMG TANK* on the first line aloft; oil pressure and motor temperature on the line in low;
 - the LED *MOTOR ON* turn on;
 - at the effective starting of the pump, the LED *RUN* turn on;
 - the contact of alarm at the clamps 33 and 34 *MOTOR STARTED* is closed;
 - there is not any signals of alarm.
- when the contact *FLOAT SWITCH PRIMING TANK* will return closed, the pump will arrest himself and the control panel will return at the situation before the call ¹⁸.

Simulation of Flow Survey¹⁹:

- Close the contact *FLOW SWITCH* at the clamps 7 and 8.
 - \checkmark Verify that:
 - immediately, the *Type A* alarm (*fire in progress*) turn on, with the closing of the contacts at the clamps 29 and 30;
 - the contact of alarm at the clamps 45 and 46 *FLOW SWITCH*, is closed;
 - the LED SPRINKLER ALARM turn on.
- Open the contact at the clamps 7 e 8.
 - ✓ Verify that:
 - the control panel will return at the situation before the simulation.

Note:

During the life cycle of the system, hold the panel under tension, always. Remember that the batteries are charged by means battery-charger. Even if alternator is present, the batteries can be charged by alternator.

¹⁹ <u>THIS TYPE OF ALARM DON'T MAKE START THE PUMP</u>. The norm contemplates that, into the room when is installed the fire-fighting group, there is a sprinkler hydrant connected with a flow switch. The activation of the sprinkler causes a (pre) alarm from the flow switch that intervenes a lot before the pressure switches.



¹⁷ The buttons *TEST* and *START* are disabled with the selector switch at the position *AUTO*. The buttons will be enabled after a start failure, only. To disabling the emergency start you must rotate the selector switch at the position OFF or MANU. <u>A further emergency start, ever enabled, stays on the front of panel, protected by means of a breakable glass.</u>

¹⁸ During a stage of priming, if there is a call from fire in progress, this condition will replace at the previous.



Information on the disposal of electrical and electronic equipment in compliance with Directive 2012/19 / EU

- Warning: to dispose of this product do not use the normal garbage can used electrical and electronic equipment must be managed separately and in accordance with the legislation that requires the proper treatment, recovery and recycling of the aforementioned products. As a result of the provisions implemented by the Member States, individuals resident in the EU can transfer used electrical and electronic equipment free of charge to designated collection centers. In case of difficulty in finding the authorized waste collection center, contact the dealer from whom the product was purchased. The national legislation provides for penalties for those who carry out the illegal disposal or the abandonment of waste electrical and electronic equipment.

