INSTRUCTION MANUAL

PRO-FLOW

TURBINE FLOWMETER WITH
AUTOMATIC PROGRAMMABLE STOP

ENGLISH

PLEASE, CAREFULLY READ
THIS INSTRUCTION MANUAL
BEFORE USING THE INSTRUMENT
AND KEEP IT FOR FUTURE REFERENCE.

PRO-FLOW WITH TURBINE FLOWMETER INSTRUCTION MANUAL

This instruction manual has the only purpose to show the product and give operating indications. The information herewith contained can be changed without notice. Polmac srl is not responsible for any direct or indirect faults caused by the use of the manual.

STANDARD SAFETY RULES

Please read the following standard safety rules to avoid personal leisures and prevent damages to the product. To avoid any eventual risks, use and install the Pro-Flow following the procedures specified herewith. Maintenance must be made by authorized qualified personnel only.

- Use the power supply cable specifically intended for this purpose.
- Connect the flowmeter sensor and level sensor when the instrument is off.
- Never action the Pro-Flow if bad functioning is suspected.
- Do not touch connections and components exposed under any electric current.
- Do not action the product with water or humidity.
- Do not use the instrument to measure inflammable liquids.
- Do not action the product while into an explosive atmosphere.
- Take off operator's hand from lever as soon as the rearmament operation is finished (throttle valve open) and do not get close till lever itself has not come into a position of stand-by (throttle valve closed).

ELECTROMAGNETIC COMPATIBILITY

The Pro-Flow is in accordance with the concerned Regulation 89/336 CE with the application of the standard UNI EN ISO 14982.

WARRANTY

Our products are guaranteed for 12 months from the delivery date. Our guarantee covers all parts that are materially detective or that have manufacturing defects.

The guarantee will be considered void in case of insufficient maintenance and improper use. The guarantee does not cover any parts not manufactured by our company. Repairs must be made at our factory or by personnel who we have authorized. For all service the product must be sent by freight prepaid. The labour expenses are not included in the guarantee. Whenever you request a repair or replacement under warranty, always inform us of the instrument's serial number which is located on the adhesive label.

PRODUCT RECYCLING

Equipment can contain substances dangerous for environment and people's health, if inadequately recycled. To avoid that these substances are loosed into environment, the suggestion is to recycle this product adequately so that to guarantee that the major part of the materials are adequately re-used and recycled.

USE

The instrument is made to control the quantities of liquid going through the pipe it is mounted on; it is provided with a throttle valve closing system controlled by the display so that to enable the interruption of the flow.

POWER SUPPLY

12Vcc ±15% direct current.

Ø	VERSION	CODE	CURRENT	REMARKS
1" ½	Pro-Flow 1 Compact	00379007	Parallel *	Display mounted on the flowmeter. Level as an option.
	Pro-Flow 2 Remote	00379010	Parallel *	Display at distance. Level as an option.
	Pro-Flow 1 Compact	0037CI07	Inverted **	Display mounted on the flowmeter. No level.
	Pro-Flow 2 Remote	0037CI10	Inverted **	Display at distance. No level.
2"	Pro-Flow 1 Compact	003790G2	Parallel *	Display mounted on the flowmeter. Level as an option.
	Pro-Flow 2 Remote	003790G3	Parallel *	Display at distance. Level as an option.
	Pro-Flow 1 Compact	0037CIG2	Inverted **	Display mounted on the flowmeter. No level.
	Pro-Flow 2 Remote	0037CIG3	Inverted **	Display at distance. No level.
2" ½	Pro-Flow 1 Compact	00379013	Parallel *	Display mounted on the flowmeter. Level as an option.
	Pro-Flow 2 Remote	00379014	Parallel *	Display at distance. Level as an option.
	Pro-Flow 1 Compact	0037CI13	Inverted **	Display mounted on the flowmeter. No level.
	Pro-Flow 2 Remote	0037CI14	Inverted **	Display at distance. No level.

* Outlet voltage, on the side electric socket, throttle valve open: 12 Vcc. – 5A.
Outlet voltage, on the side electric socket, throttle valve closed: 0 Vcc.

** Outlet voltage, on the side electric socket, throttle valve open: 0 Vcc.
Outlet socket, on the side electric socket, throttle valve closed: 12 Vcc. – 5A.

INTRODUCTION

This instruction manual has been worked out in order to understand all the steps offered by the instrument. To stress it, we started from the following layings:

READING SCALE	UNIT	L/M.
CALIBRATION CONSTANT DECIMAL POINT	POINT K	0.1
READING VALUE DECIMAL POINT	POINT TOT	0
SET LEVEL	SET LEVEL	OFF

As a result, would the set variable values be different while programming, the scales of the above mentioned instructions may result to be not in sequence.

For a better understanding, variable programming concerns:

UNIT	L/M	GPM	M³/h
POINT K	0	0.1	0.01
POINT TOT	0	0.1	
SET LEVEL	OFF	ON	

The numerical values mentioned within this manual are purely indicative and used just as an example.

MAIN FEATURES

- Programmable automatic stop device for flow electronic measurement, 12 Vcc. Power supply.
- Turbine flowmeter with ceramic bearings.
- Set of the total quantity to reach.
- Automatic closure of the throttle valve at total reached.
- Automatic closure of the throttle valve at main tank full (only into the version with connection to electronic level).
- Pre-arrangement to "Full Tank" electronic level connection, for some models only.
- Liters/Minute, Gallons/Minute, Cubic metres/Hour flow measurement.
- Available into the "Compact" and "Remote" version.
- Easy use through 3 separated Menu: 1) Reading Menu; 2) User Menu; 3) Supervisor Menu.

- Three selectable reading scales [UNIT]: L/M (liters per minute) – GPM (gallons per minute) – M³/h (cubic meters hour).
- Possibility to set the calibration constant (K) with 0 – 1 – 2 decimal points [POINT K].
- Possibility to set the reading scales with 0 – 1 decimal point [POINT TOT].
- Possibility to connect the external level as a "Full Tank" signal [SET LEVEL], only for the models 00379007 – 00379010 – 003790G2 – 003790G3.
- 2 Vcc voltage – 5A external socket. (either parallel or inverted voltage, depending on magnet voltage).
- Accuracy ±1%.

WORK SETTING

- Connect the power supply cable coming out the Pro-Flow body to the 12Vcc. Power supply.
- Connect the display to the body of the Pro-Flow using its own cable (remote versions only).
- Connect the display to the sensor of the flowmeter using its own cable (remote versions only).
- Connect the display to the full tank level sensor (only for versions with external level).
- Turn on the instrument using the special on/off switch situated on the left hand side of the Display, close to the fuse carrier. Do the calibrations and operations as per described in the following paragraphs.

TECHNICAL FEATURES

MODEL	MINIMUM FLOWRATE	MAXIMUM FLOWRATE	MAXIMUM PRESSURE	BEST TEMPERATURE
PRO-FLOW 1 ½" 00379007 – 00379010 0037CI07 – 0037CI10	35 lt/min. 9,25 GPM 2,1 cubic meters hour	350 lt/min. 92,5 GPM 21 cubic meters hour	8 BAR 116 PSI	0÷40 °C 32÷105 °F
PRO-FLOW 2" 003790G2 – 003790G3 0037CIG2 – 0037CIG3	75 lt/min. 19,81 GPM 4,5 cubic meters hour	750 lt/min. 198,1 GPM 45 cubic meters hour	8 BAR 116 PSI	0÷40 °C 32÷105 °F
PRO-FLOW 2 ½" 00379013 – 00379014 0037CI13 – 0037CI14	100 lt/min. 26,42 GPM 6,0 cubic meters hour	1000 lt/min. 264,2 GPM 60 cubic meters hour	8 BAR 116 PSI	0÷40 °C 32÷105 °F

MAINTENANCE AND INSTALLATION GENERAL RULES

- The Pro-Flow can be mounted either horizontally or vertically, on both the aspiration and the delivery side, protected from the elements, from prolonged exposure to sunlight and from mechanical vibrations. Any position will be chosen, the operator must check the calibration of the instrument due to a different application can affect its accuracy.
- The instrument shows an arrow "⇦ FLOW" indicating the direction of the application, in comparison with the flow we have to control.
- To prevent any measuring mistakes, because of the presence of some air, check that there is no air inside the pipe.
- Always fix the instrument using the feet given as an equipment.
- Check that pipes are well anchored and sealed on both inlet and outlet of the instrument.
- Do not install the Pro-Flow close to necks and/or elbows able to create turbulences to the flow.
- Pressure used to wash the exterior of this equipment, could cause irreversible water damage to the electronic components. To prevent any damage, remove the display while washing the equipment's exterior. The manufacturer declines all responsibilities for damage to the display that is the result of operator negligence.
- Liquid to be controlled must not contain any suspended particles damaging the internal mechanical parts.
- Do not action should any "water hammer" be throughout the pipe.
- Press the keys of the display carefully.
- Periodically lubricate shaft's gaskets using the lubricators given as an equipment.
- Periodically fill the lubricators with lubricating fluid fat.

PRO-FLOW DEFECTS, CAUSES AND CORRECTIVES

DEFECT ENCOUNTERED	POSSIBLE CAUSE	POSSIBLE CORRECTIVE
The instrument will not turn on	Polarity is reversed	Invert current's polarity
	Fuse is damaged	Replace fuse
	Defect with 12 volt power supply	Check pins and power supply cable
The instrument will not indicate the flow rate	Defective sensor cable (Pro-Flow 2 version)	Replace sensor cable
	Defective flowmeter sensor	Replace sensor
	Flowmeter turbine blocked	Flowmeter maintenance
The instrument indicates a wrong flow rate	Turbine supports dirty	Flowmeter maintenance
	Calibration constant not correct	Change calibration constant "K"
Valve does not stay opened during the START phase	Instrument is in its STOP phase	Enter the START phase
	Defective electromagnet	Replace the electromagnet
	Electromagnet and/or caps oxidated	Remove corrosions
Valve does not close during the STOP phase	Defective spring	Replace spring
	Stuff blocked in proximity to the throttle valve	Remove the stuff
Valve does not close when tank is full *(only for versions with level)*	Floating blocked	Remove floating
	Defective level	Level revision/replacement
Display does not turn on and functions cannot be done	Defective electronic card	Replacement of the electronic card
Message: "Level Error"	Level not connected	Connect level
	Version of Pro-Flow without level	Set: "Set Level Off"

FEEDERS (OPTIONAL)

83125400	220V. feeder – 12Vcc. 5A.
83125600	220V. feeder – 12Vcc. 7A.

LEVELS (OPTIONAL)

01331799	Plastic Level
01333399	Stainless Steel Level

SPARE PARTS ORDER

To order spare parts specify:

- Serial number of the display.
- Part number of the part to be replaced.
- Quantity.
- Shipping desired.

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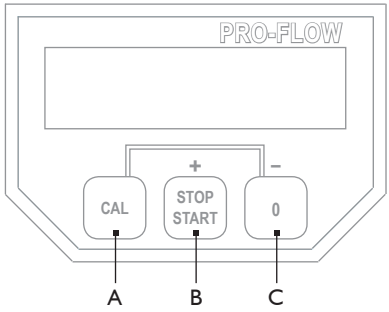
FUNCTION OF THE KEYS



Red key “A”

a) Used to visualise the USER MENU and confirm modifications on both USER and SUPERVISOR MENU;
b) If pressed together with the green key, while on the STOP phase, it sets the total units to zero.

Orange Key “B”

a) Used to shutdown “STOP” or to start-up “START” the electro-magnet enabling the opening of the throttle valve and voltage on the outlet socket;
b) During the calibration phase it is used to increase the setting values into the USER and SUPERVISOR MENU;
c) If pressed together with the green key for 5 seconds, you move from the READING MENU to the SUPERVISOR MENU.

Green key “C”

a) If pressed together with the red key, while on the STOP phase, it sets the total units to zero;
b) During the calibration phase, it is used to decrease the setting values into the USER MENU and into the SUPERVISOR MENU;
c) If pressed together with the orange key for 5 seconds, you move from the READING MENU to the SUPERVISOR MENU.

Function STOP “⌛”

a) Used to deactivate the electromagnet and, as a consequence, to place the throttle valve into the closed position before the cycle ends; indicated by the symbol “⌛”.
b) During the STOP phase, it is possible to set total units to zero;
c) During the STOP phase it is possible to enter the USER MENU and the SUPERVISOR MENU;
d) During the STOP phase there is no voltage on the outlet socket, this for parallel current versions;
e) During the STOP phase there is voltage on the outlet socket, this for inverted current versions.

Function START “↺”

a) Used to activate the electromagnet and, by consequence, to manually place the throttle valve into the open position; indicated by the symbol “/” turning “↺”;
b) During the START phase it is possible to set total units to zero;
c) During the START phase it is possible to enter the USER MENU and the SUPERVISOR MENU;
d) During the START phase there is voltage on the outlet socket, this for parallel current versions;
e) During the START phase there is no voltage into the outlet socket, this for inverted current versions.

CALIBRATION CONSTANT "K" CALCULATION

Each flowmeter is delivered with a identification label showing the indicative number of pulses per liters. Such a value, can change in excess or defect, depending on the type of application and use of the flowmeter. Always make a test of comparison between the total displayed and the liquid actually delivered to calculate the correct number of pulses to use for the new calibration of the instrument itself. Such a test must be done with a new flowmeter and, on a second time, at regular intervals.

Example:	*Liquid monitored by the instrument*	*150 liters/minute;*
	Liquid actually delivered by the system	*147 liters/minute;*
	K Calibration constant setting	*101,0*

Analyzing these information, it is necessary to make a modification to the "K" calibration constant set, using the following formula:

$$\frac{101{,}0 \times 150}{147} = 103{,}0$$ *(new K calibration constant to set).*

1) when the value monitored is lower than the actual (delivered) one, you need to decrease the value of the calibration constant previously set;
2) when the value monitored is higher than the actual (delivered) one, you need to increase the value of the calibration constant previously set.

FUNCTION OF THE SWITCH

The ON/OFF switch has the function to activate and deactivate the instrument.
Fuse is 5A. Before ignition, the instrument is on the STOP "⌛" phase. Once the instrument is switched off, the magnet is deactivated and, as a consequence, the throttle valve is closed.

EXTERNAL FUNCTIONS ACTIVATION

The Pro-Flow is pre-arranged to activate possible external functions (electro-valve, sound or lighting indicators, etc.). Socket for external functions is situated on the right side of the instrument, front sight, indicated by "⇦ FLOW" and can deliver a voltage of 12Vcc. – 5A maximum. Voltage on the socket can be aligned with the magnet parallel or reversed in comparison with magnet.

PARALLEL VOLTAGE:

- Outlet voltage while the instrument is in the START phase (condition enabling the opening of the throttle valve also);
- No outlet voltage while the instrument is the STOP phase (condition not enabling the opening of the throttle valve).

REVERSED VOLTAGE:
· No outlet voltage while the instrument is in the START phase (condition enabling the opening of the throttle valve also);
· Outlet voltage while the instrument is in the STOP phase (condition not enabling the opening of the throttle valve).

IMPORTANT:
the Pro-Flow keeps all its features, even if Socket for external functions is not connected/used.

ELECTRIC CONNECTIONS 12Vcc. Power supply (2x1 cable)

Brown thread	Positive
Blue thread	Negative

ILME 4 poles socket, for external functions, situated on the right hand side, front sight, with arrow indicating flow direction "⇦ FLOW"

Pin 1	Free
Pin 2	Free

Pin 3	Positive
Pin ¥	Negative

ILME 4 poles socket, for connection to the display, situated on the left hand side, front sight, with arrow indicating flow direction "⇦ FLOW"

Pin 1	12Vcc. display power supply
Pin 2	0 V. display power supply

Pin 3	Positive electro-magnet blocking the throttle valve
Pin ¥	Negative electro-magnet blocking the throttle valve

Deutsch 3 poles DT04-3P socket, for connection to sinusoidal wave sensor (only for remote version)

Pin A	Free	Pin B	Brown signal for sinusoidal sensor
Pin C	White + Screened sinusoidal sensor signal		

Deutsch 3 poles DT06-3S socket, for connection to level sensors

Pin A	Green common to both levels
Pin B	White signal plastic level
Pin C	Brown signal stainless steel level

CABLES GIVEN AS EQUIPMENT

· 4,5 mt cable to connect display to level sensor (*only for versions with external level*).
· 2 mt cable to connect display to Pro-Flow body (*only for remote version*).
· *REMARKS: flowmeter sensor used in this version is equipped with a 2mt cable*

SUPERVISOR MENU						
MENU	FUNCTION	KEY/S	PRESS (X TIMES)	TIME	MESSAGE	LIGHTING
Set the Reading Scale		B+C	1	5 seconds	UNIT L/M	No
SUPERVISOR	Change into GPM	B	1	1 Istant	UNIT GPM	Yes
	Change into M^3/h	B	1	1 Istant	UNIT M^3/h	Yes
	Confirm Value	A	1	1 Istant	UNIT ???	No
	Outlet	A	5	1 Istant	S00030 P00000 T00000000 ⌛ L/M	No

MENU	FUNCTION	KEY/S	PRESS (X TIMES)	TIME	MESSAGE	LIGHTING
Set the Constant Calibration Decimal Point		B+C A	1 1	5 seconds 1 Istant	UNIT L/M POINT K 0.1	No No
SUPERVISOR	Change at 0 decimals	C	1	1 Istant	POINT K 0	Yes
	Change at 2 decimals	B	1	1 Istant	POINT K 0.01	Yes
	Confirm Value	A	1	1 Istant	POINT K ???	No
	Outlet	A	4	1 Istant	S00030 P00000 T00000000 ⌛ L/M	No

MENU	FUNCTION	KEY/S	PRESS (X TIMES)	TIME	MESSAGE	LIGHTING
Set the Calibration Constant K		B+C A	1 2	5 seconds 1 Istant	UNIT L/M K 101.0	No No
SUPERVISOR	Decrease Total	C	1	Up to the Constant	K 100.9	Yes
	Increase Constant	B	1	Up to the Constant	K 101.1	Yes
	Confirm Constant	A	1	1 Istant	K ???	No
	Outlet	A	3	1 Istant	S00030 P00000 T00000000 ⌛ L/M	No

SUPERVISOR MENU						
MENU	FUNCTION	KEY/S	PRESS (X TIMES)	TIME	MESSAGE	LIGHTING
Set reading values' decimal point		B+C A	1 3	5 seconds 1 Istant	UNIT L/M POINT TOT 0	No No
SUPERVISOR	Change at 1 decimal	B	1	1 Istant	POINT TOT 0.1	Yes
	Confirm Value	A	1	1 Istant	POINT TOT ???	No
	Outlet	A	2	1 Istant	S00030 P00000 T00000000 ⌛ L/M	No

MENU	FUNCTION	KEY/S	PRESS (X TIMES)	TIME	MESSAGE	LIGHTING
Set level setting		B+C A	1 4	5 seconds 1 Istant	UNIT L/M SET LEVEL OFF	No No
SUPERVISOR	Change into "ON"	B	1	1 Istant	SET LEVEL ON	Yes
	Change into "OFF"	C	1	1 Istant	SET LEVEL OFF	Yes
	Confirmation and Exit	A	1	1 Istant	S00030 P00000 T00000000 ⌛ L/M	No

MENU	FUNCTION	KEY/S	PRESS (X TIMES)	TIME	MESSAGE	LIGHTING
Setting of the Level Type *		B+C A	1 5	5 seconds 1 Istant	UNIT L/M SET SIGNAL ...	No No
SUPERVISOR	Change into "RWD" **	B	1	1 Istant	SET SIGNAL RWD **	Yes
	Change into "FWD" **	C	1	1 Istant	SET SIGNAL FWD **	Yes
	Confirmation and Exit	A	1	1 Istant	S00030 P00000 T00000000 ⌛ L/M	No

* This message only appears when "ON" has been confirmed within the previous message.

** RWD = Stainless Steel Level (cod. 01333399) ** FWD = Plastic Level (cod. 01331799)

READING MENU						
MENU	FUNCTION	KEY/S	PRESS (X TIMES)	TIME	MESSAGE	LIGHTING
READING	Ignition	ON	1	–	S00030 P00000 T00000000 ⧖ L/M	No
	Extinction	OFF	1	–		No
	Total zero setting	A+C	1	1 Istant	S00030 P00000 T00000000 ⧖ L/M	No
	STOP function	B	1	1 Istant	S00030 P00000 T00000000 ⧖ L/M	No
	START function	B	1	1 Istant	S00030 P00000 T00000000 ⧖ L/M	Yes

USER MENU						
MENU	FUNCTION	KEY/S	PRESS (X TIMES)	TIME	MESSAGE	LIGHTING
USER	Total Setting	A	1	5 seconds	STOP TO 30	No
	Decrease Total	C	1	Up to Total	STOP TO 20	Yes
	Increase Total	B	1	Up to Total	STOP TO 100	Yes
	Total confirmation	A	1	1 Istant	STOP TO ???	No
	Outlet	A	1	1 Istant	S00100 P00000 T00000000 ⧖ L/M	No

- *Pro-Flow instructions manual in english:* www.polmac.it/doc/proflow-en.pdf
- *Manuale Istruzioni Pro-Flow in Italiano:* www.polmac.it/doc/proflow-it.pdf
- *Instrucciones de Pro-Flow en Español:* www.polmac.it/doc/proflow-sp.pdf
- *Notice instructions Pro-Flow en français:* www.polmac.it/doc/proflow-fr.pdf
- *Deutschsprachige Anleitung für Pro-Flow:* www.polmac.it/doc/proflow-de.pdf