IOM manual

Batch Control Unit

BATCHER

Edition 2024

Read this instruction manual carefully before you install and operate the pump.

All about your flow

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1. GENERAL

The following instruction manual embraces safety and operation rules for the Control cabinets for pumps and pump units. Before beginning to operate the devices please read this instruction carefully.
In case of any difficulties with understanding the instruction, technical problems, or a need for spare parts – please contact your local Tapflo distributor.

1.1. Introduction

Tapflo Control Cabinets are designed to be used with dedicated pumping systems in variety of solutions such as: dosing, maintaining a certain capacity, maintaining a constant level, etc.
Enclosure is made of plastic with IP65 protection, ensuring class II insulation and chemical resistance.

1.2. Qualifications and training

Operator of a control cabinet is obligated to obey safety and caution rules, including but not limited to:
- using a device in accordance with its appliance,
- ensuring adequate power supply for the system and connecting the appropriate load not exceeding the nominal permissible load power for the unit.

The device is under voltage, there is a risk of electric shock.

All kinds of electrical work should only be carried out by qualified personnel with the electric permissions

1.3. Receiving inspection

Although precaution is taken by us when packing and shipping, we urge you to carefully check the shipment on receipt. Make sure that all parts and accessories listed on the packing list are accounted for. Immediately report any damage or shortage to the transport company and to us.
While transporting a control cabinet, it should be secured from any damage.
If weight of a control cabinet exceeds 40 kg, manual loading and unloading of it should be done by at least two persons.

1.4. Storage

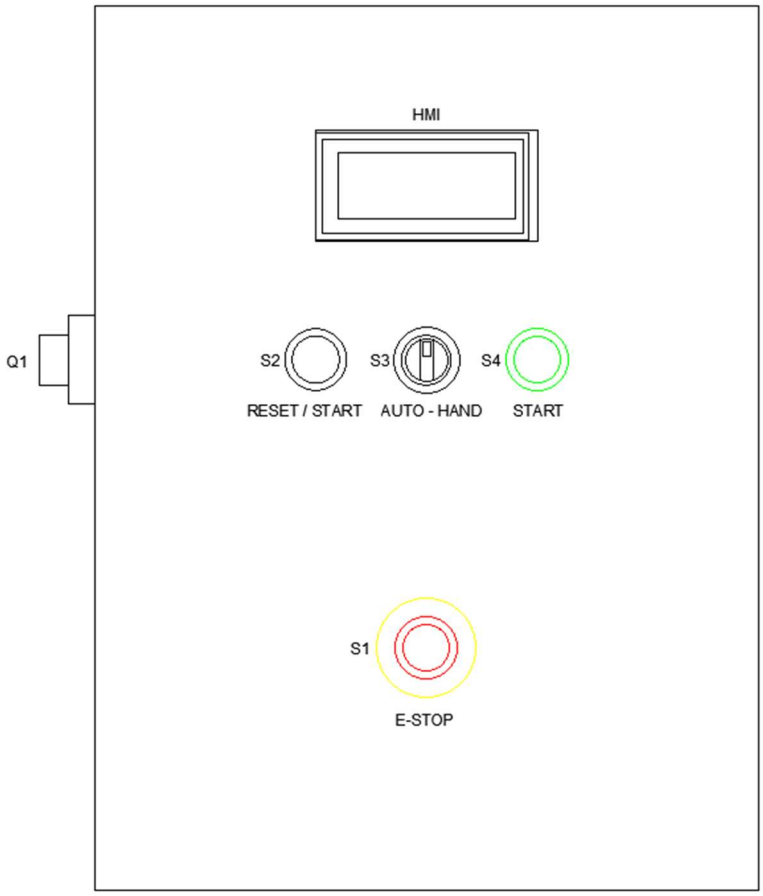
If the equipment is to be stored prior to installation, place it in a clean and dry location in temperature not lower than 0°C and not greater than 60°C.

2. TECHNICAL DATA

2.1. Appliance

This unit allows to perform batching operation (pumping on specified liquid volume) based on the signal from the Tapflo diaphragm pump.

PARAMETER	
Material	Plastic ABS
Dimensions [WxHxD]	300x400x195 mm;
IP Protection Code	IP65;
Power supply	230VAC



SIGNATURE	DESCRIPTION
Q1	Main Switch;
RESET/START (S2)	Resetting the counter and Restart in AUTO mode;
AUTO-HAND (S3)	Operating mode switch;
START (S4)	Starting pump button in HAND mode;
E-STOP (S1)	Safety button;
HMI	Counter display;

3. ASSEMBLY AND OPERATING INSTRUCTION

3.1. Assembly and operating of the control cabinet

This system is used to control Tapflo air-operated diaphragm pumps.
The system allows you to pump the desired volume of the medium.
The operation of the system is based on counting the strokes of the pump equipped with a stroke sensor.
For each pump stroke (volume of two pump chambers), a signal is sent to the system controller, where the medium volume per stroke is programmed.

3.1.1. Starting the unit:

a) Connect the power supply 230 VAC to the entire system to terminal block No. 1, N, PE (230V plug and 5m cable are included);
b) As an option connect Enable To Work signal (for example - dry-running sensor) to terminals 4 - 7 (In standard -terminals 4 and 7 are connected together)
c) Connect the stroke sensor to terminals No. 8 (BL – black), 9 (BU – blue), 10 (BR – brown), 11 (WH – white);
d) Connect the relay coil of the pump (Socket with 5 cable are connected to terminals), terminals 11, 12, PE;
e) A connection on terminals 49 and 50 is used to count impulses in the HAND mode, in order to block counting in HAND mode, you need to remove this connection.
f) All safety devices inside the control cabinet should be switched on;
g) Wait a moment after turning on the unit for the counter panel to stabilize;
h) Each time after dosing the appropriate dose of the product, the counter should be reset with the RESET button;
i) Ensure that the diode under the symbol „∑" pulsates, otherwise you should press the button on the panel [∑/RESET] so the diode starts to pulsate.
j) Before the first start-up, bleed the system, for this purpose the manual mode is best suited (point 3.1.2);

3.1.2. Manual mode control:

a) The AUTO - HAND switch (S3) should be set to HAND mode;
b) The pump is started by pressing and holding the START button (S4), as long as the button is pressed, the pump will work;
c) In the manual mode, the system counts the pump strokes by default. To block the counter of the strokes in the manual mode, inside the cabinet remove the connection between numbers 8, 9. In this case the counter in the manual mode is inactive, but in the automatic mode it will still work normally;
d) The RESET button (S2) is active, the counter can be reset;

3.1.3. Auto mode control:

a) The AUTO - HAND switch (S3) should be set to AUTO mode;
b) In AUTO mode, the pump should start dosing immediately and stop when the desired number of strokes is reached, pressing the RESET button (S2) resets the counter, and the pump will restart automatically.;
c) The display (HMI) will show the amount of dosed medium;
d) To stop the system operation without resetting the counter, set the AUTO - HAND switch (S3) to the HAND mode; After switching back to AUTO mode, the unit will continue working from the point where it was stopped.

NOTE:
The safety button (S1) prevents the pump from starting. However, remember that the safety button does not disconnect power supply from the system (elements inside control cabinet). In order to disconnect the power supply from the equipment inside the Control Cabinet, you need to turn-off the main switch (Q1).

3. ASSEMBLY INSTRUCTION

3.2. Dosing counter configuration and setting

3.2.1. Description of the display panel

Symbols and functions of push-buttons:

ESC MENU

Symbol used in the manual: **[ESC/MENU]**

Functions:

- Enter to main menu (press and hold by at least 2 sec.)
- Exit the current level and Enter to previous menu (or measure mode)
- Cancel the changes made in parameter being edited

ENTER or ENTER PAUSE

Symbol used in the manual: **[ENTER]** or **[PAUSE]**

Functions:

- Start to edit the parameter
- Enter to the sub-menu,
- Confirmation of changes made in parameter being edited
- While batcher mode: pause/start batching.

Symbol used in the manual: **[^] [v]**

Functions:

- Change of the present menu,
- Modification of the parameter value,
- Switching of the display between relay thresholds and number of batches counter

Σ FL or Σ RESET

Symbol used in the manual: **[Σ]** or **[RESET]**

Functions:

- Switching of the display between total and instantaneous measurements or batcher counter (while batcher mode only)
- Zeroing the currently displayed counter (press and hold by at least 2 sec.), the zeroing must be confirmed by **[ENTER]** button.

3. ASSEMBLY INSTRUCTION

3.2.2. Factory settings

CAUTION: Factory counter settings for dosing application are shown below. To keep the batching system working properly, the settings shown below shouldn't be changed (full description of parameters in the SPI-94 operating manual, which is an attachment to this documentation):

FACTORY SETTINGS TAPFLO			
MENU	**PARAMETER**	**SETTING**	**DESCRIPTION**
rELAy1	SourCE	bAt	Relay controlled according to the batching value;
rELAy1	Set P	-*	Relay setpoint setting (the amount of substance to be batched)
rELAy1	B PrEc	0.00	The position of decimal point (precision of threshold display)
rELAy1	B unit	unit	Unit of batched medium
inPUt	PULSEL	**4,3** **	Pulse input coefficient (number of pulses / unit of flow sensor);
bAtCH	E Clr	LO	Resetting the batcher counter with the LOW state on input and starting to batch with the HIGH state on input. In this mode the safety button stops batching and resets values. Releasing and lifting up the safety button doesn't start the pump. In order to restart the pump you need to push the „RESET" button.
Init d	-	bAt	Displaying the value of batching counter

* To be determined by your own needs (point 3.3.1.).
** The setting is designed for water, for different medium it is necessary to verify and recalculate pre-sets.

3. ASSEMBLY INSTRUCTION

3.3. Setting of units and dosing

NOTE: The parameters presented below should be set according to your needs, with factory settings the counter will only count and display litres (system calibrated on water), it is recommended that additional calibration of the device (converter impulse to litre / m ^ 3) be performed on the target medium by the user as instructed below. Full description of parameters in the SPI-94 operating manual, which is an appendix to this documentation.

3.3.1. Procedure for setting the set point:

Step:	
1.	Press button: ,
2.	When the display shows **RELAY1**, press: ENTER PAUSE,
3.	With the buttons: you can change the value of the flashing digit,
4.	After pressing: ENTER PAUSE the edited digit will be changed,
5.	After assigning the appropriate value, press and hold the button for 3 seconds: ENTER PAUSE,
6.	When the value **SET?** appears in the display, press the button: ENTER PAUSE,

3.3.2. Scaling units:

Step:	
1.	Press for 3 seconds: ESC MENU to enter the menu,
2.	With the buttons: find **INPUT** option**,**
3.	Press: ENTER PAUSE,
4.	When the **PULSEL** function is displayed press: ENTER PAUSE,
5.	Set the value of pulses per unit depending on the pump size used.
6.	After confirming the setting, press: ESC MENU to go back to the main menu.

3.3.3. Device calibration procedure:

Step:	
1.	Set 1.0 in the **PULSEL** parameter,
2.	Set the dosing setpoint for a known pulse value (e.g. 10 or 100),
3.	Start the dosing,
4.	Check the amount of dosed liquid
5.	Calculate how many pulses you have per unit (per liter or m3),
6.	Set this value in the **PULSEL** parameter,
7.	Change the adjustment to the requirements of the application,

3. ASSEMBLY INSTRUCTION

3.4. Unit calculation example (Volume per stroke)

The table below shows the volume of liquid dispensed by a specific type of Diaphragm Tapflo pumps. The values refers to pumps with PTFE diaphragms (please contact Tapflo for data for other materials). The volume per stroke can be different depending on pump operating parameters.

TECHNICAL DATA	PUMP SIZE						
	TR9	TR20	T50	T100	T200	T400	T800
Max capacity* [l/min] / [US GPM]	11 / 2.9	24 / 6.3	60 / 15.8	125 / 33	330 / 87	570 / 150	820 / 216
Volume per stroke** [ml] / [cu in]	15 / 0.92	26 / 1.59	116 / 7.08	305 / 18.6	854 / 52.1	2326 / 141.9	5240 / 319.8

Example :

For pump T50 volume per stroke is 116ml;
Value of volume per stroke (impulse from sensor) can be calculated in the following way:

- 5CF sensor (single pump stroke sensor) = 1000/116 = 8,6;
- 5C sensor (pump cycle sensor) = 500/116 = 4.3;

For T50 pump with -5CF sensor in PULSEL parameter value that should be written is 8,6 but for pump with -5C sensor it should be written value 4,3;

Experimental method calibration example :
For T50-5C pump the **PULSEL** parameter was calculated = 4,31.

Calculations were done according to procedure described in 3.3.3. After dosing 50 pulses, the 11,63 l of water was measured.

The pumped quantity per cycle (pulse from the sensor) can be calculated:
Stroke sensor =50/11,63 = 4,31

NOTE:

The operator can calibrate the unit in liters, kilograms or any unit which is needed.

Above values was calculated for water, with other fluids it may appear a difference, it is recommended to check dosed volume of product and calibrate unit.

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