

BOOM SECTION VALVES WITH FORK COUPLING

((

SERIES 863T - 873T

INSTALLATION, USE AND MAINTENANCE



= Generic danger



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MANUAL USE MODES

The section of this manual dedicated to the installation contains information for installers. For this reason we have used technical terms without providing explanations which would be necessary for end users only.

THE INSTALLATION MUST BE CARRIED OUT BY AUTHORIZED AND SKILLED PERSONNEL ONLY. ARAG IS NOT RESPONSIBLE FOR ANY OPERATION SPECIFIED IN THIS MANUAL CARRIED OUT BY UNAUTHORIZED OR UNSKILLED PERSONNEL.

RESPONSIBILITY

The installer must carry out "workmanlike" installations and ensure to the end user the perfect operation of the whole system both with ARAG components only and other brands' components.

ARAG always recommends using its components to install control systems.

The installer will be held responsible for any malfunction if he decides to use other brands' components even without actually changing the system parts or harness.

The compatibility check with components and accessories of other manufacturers shall be carried out by the installer.

If the ARAG components installed together with other brands' components get damaged because of what stated above, no direct or indirect warranty will be provided.

1 SAFETY GUIDELINES



CAUTION:

All installation and maintenance operations must be carried out by qualified personnel with circuit not under pressure and without power supply (connector disconnected).

Use suitable tools and any individual protection equipment deemed necessary.

Use ONLY clean water for spraying tests, calibrations and simulations: using chemicals during simulated spraying runs can seriously injure persons in the vicinity.

Do not operate the valve with no load for long periods of time, as this might damage the components inside the valve.

ARAG declines any responsibility for direct or indirect damage deriving from the type of fluids used in the system.

The use of such substances is made under the full responsibility of the operator, who therefore must follow the safety measures indicated by the fluid manufacturer on the package and wear suitable personal safety equipment (gloves, coverall, boots, helmet, etc.) in compliance with the law provisions.

ARAG may not in any way be held responsible for accidents or damage to persons, animals or objects caused by improper, unprotected, or non-recommended use of the products utilized.

2 INTENDED USE

The 863T - 873T electric valves have been designed for agricultural use.

Fitted inside a pressurized system on spraying and crop spraying machines, they allow an adjustable output of chemicals.

These valves are intended for professional use.

This device has been designed for installation on agricultural spraying and crop spraying machines.

The equipment has been designed and manufactured in compliance with the following Directives:

- EMC Directive 2014/30/EU and subsequent amendments;
- Machinery Directive 2006/42/EC and subsequent amendments.
 - compliance with Machinery Directive is applied in the following essential requirements:
- 1.1.2, 1.1.3, 1.1.6, 1.3.1, 1.3.2, 1.3.3, 1.3.4, 1.3.7, 1.3.8.1, 1.5.4, 1.5.5, 1.5.6, 1.6.1, 1.6.5, 1.7.1, 1.7.4, 1.7.4.1, 1.7.4.2, 1.7.4.3.
- this partly completed machinery shall not be placed on the market until the final machine of which it is a part is declared in conformity with the Machinery Directive 2006/42/EC.

3 LIMITATIONS OF USE

The 863T - 873T series electric valves may not be used:

- as safety valves;
- in systems where gases, vapors, or similar pass through;
- in systems for explosive atmospheres;
- in contact with food stuff;
- in civil systems.

4 PRECAUTIONS



- Do not aim water jets at the equipment.
- Do not use solvents or fuel to clean the outer surfaces.
- Do not clean equipment with direct water jets.
- Comply with the specified power voltage (12 VDC).
- In case of voltaic arc welding, remove connectors from the device and disconnect the power cables.
- Only use ARAG genuine spare parts and accessories.

5 INSTALLATION

- The components, pipes and valves that will be installed in the system must withstand a pressure higher than the maximum one of the system.
- Any constriction in the system may lead to a faulty over-pressure.
- Make sure that hoses, hose tails and valve flanges feature a suitable and compatible diameter.



CAUTION: connect the power supply connector to the valve only after having completed the hydraulic connections.

OPERATING THE VALVE WITH ONE OR MORE INLETS/OUTLETS OPEN IS VERY DANGEROUS AND CAN CAUSE ACCIDENTS AND SERIOUS INJURIES TO THE INSTALLATION OR MAINTENANCE PERSONNEL.



CAUTION: TO AVOID DAMAGING THE SYSTEM, MAKE SURE THAT NONE OF THE PARTS COMES INTO CONTACT WITH MOVING PARTS OF THE FARMING MACHINE.

6 POSITION ON FARMING MACHINE

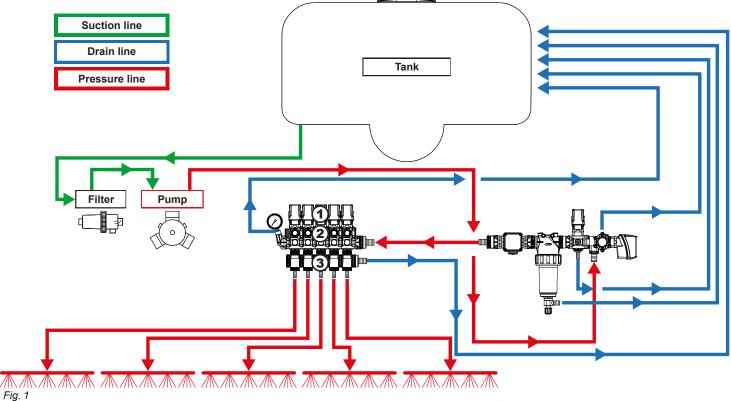
6.1 Hydraulic circuit

The 863T and 873T valves are components designed for the distribution of chemicals.

They are assembled with other elements to form electric control units with different configurations (ref. corresponding manual).



Additional couplings, O-rings and other additional parts (valves, filters, flowmeters, etc.) must be ordered separately (general Arag catalog): when choosing the items, make sure that preset connections are correct for the valves (section 6.3 - 6.4).



Legend:

- 1 Boom section electric valves
- 2 Metered by-passes
- 3 Manifolds with pressure relief valve

6.2 Boom section electric valves

They open/close the corresponding boom section; in case of valves with metered by-passes, the valve closed position is the same as the drain position of the corresponding metered by-pass.

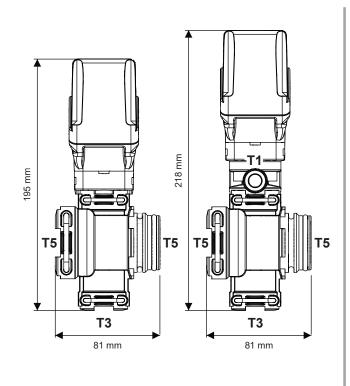
6.2.1 Metered by-passes

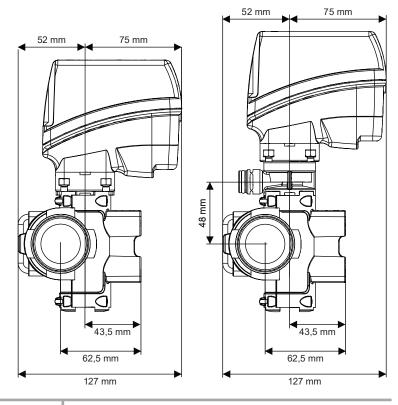
Suitably adjusted, they allow maintaining the spraying pressure value constant when closing one or more boom sections.

6.2.2 Pressure relief manifolds

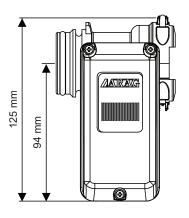
They allow resetting the pressure of the liquid that remains trapped between the section valves and the anti-drip valves, reducing the dripping.

6.3 Overall dimensions - SERIES 863T

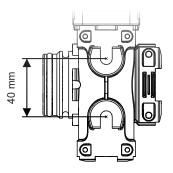




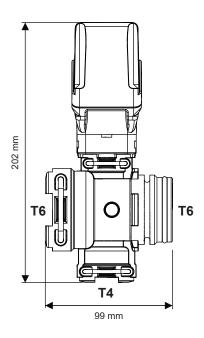
Center distance of the valves 57 mm 57 mm

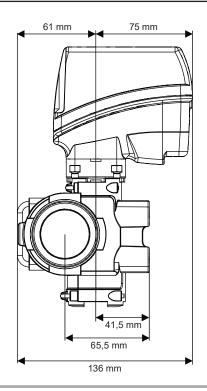


Position of the drilling points for the attachment bolts

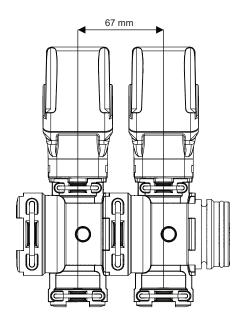


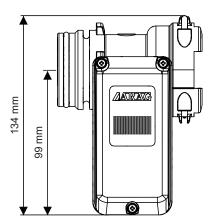
6.4 Overall dimensions - SERIES 873T



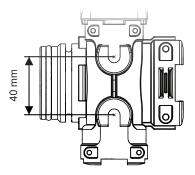


Center distance of the valves





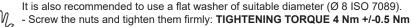
Position of the drilling points for the attachment bolts



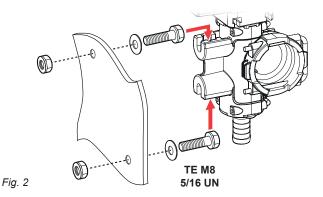
6.5 Attachment

The valve is factory set to be attached using bolts of the indicated type:

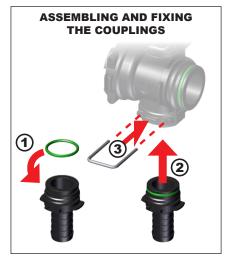
- Insert the bolts into their respective seats and turn them to the stop position to prevent them from coming out.



No other types of coupling are permitted than those described.



7 HYDRAULIC CONNECTIONS



Connect the components with fork coupling as follows:

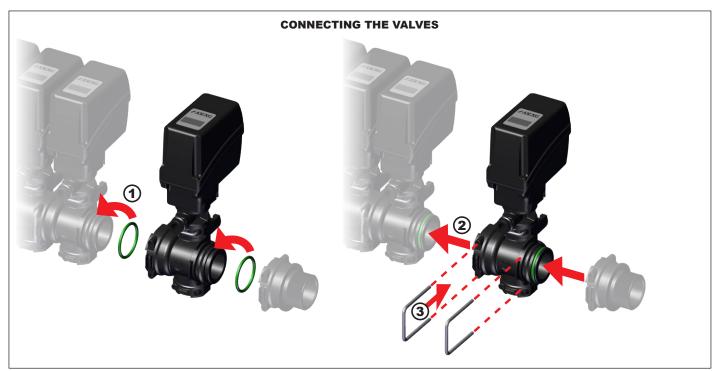
- Apply O-ring lubricant.
- Position the O-ring ON THE MALE CONNECTION OF ALL THE COUPLINGS (make sure that the position is correct).
- The couplings shown are indicative.



The maximum operating pressure of the valve is indicated in the technical data sheet of the product.

ONLY after all the hydraulic connections of the circuit to the relevant pipes have been made, put the system under pressure ONLY WITH CLEAN WATER FIRST to make sure that the connections are not leaking.

If, for any reason, the pipes leak at connection points, apply PTFE tape to improve sealing.



CONTINUES >>>

Connect the components with fork coupling as follows:

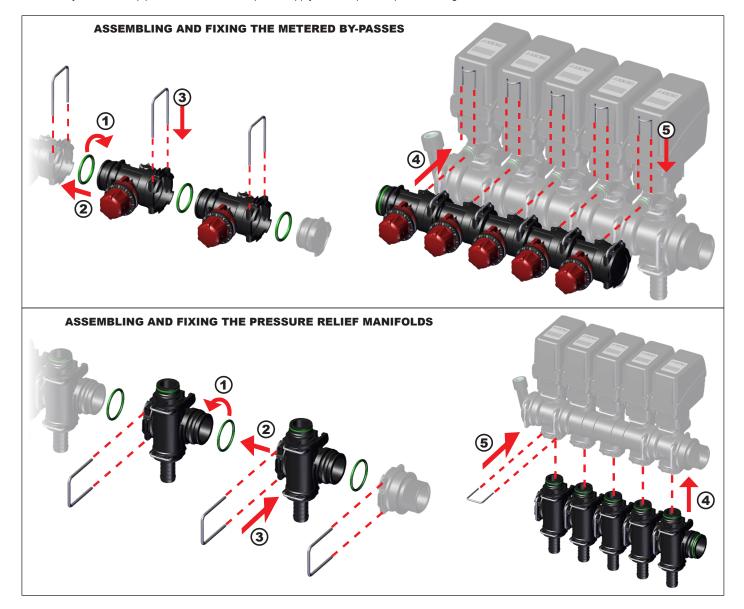
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- The couplings shown are indicative.



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ONLY after all the hydraulic connections of the circuit to the relevant pipes have been made, put the system under pressure ONLY WITH CLEAN WATER FIRST to make sure that the connections are not leaking.

If, for any reason, the pipes leak at connection points, apply PTFE tape to improve sealing.



8 WIRING CONNECTIONS



- · The unit must be connected and commissioned by specialized personnel.
- Use only the cables provided with ARAG computers or control boxes.
- Take care not to break, pull, tear or cut the cables.
- Occasionally check that harness and single cables are undamaged.
- Use of unsuitable cables not provided by ARAG automatically voids the warranty.
- · ARAG is not liable for any damage to the equipment, persons or animals caused by failure to observe the above instructions.

8.1 General precautions for a correct harness position

- Securing the cables:
- secure the harness so that it does not interfere with moving parts;
- route the harnesses so that they cannot be damaged or broken by machine movements or twisting.
- Fitting the cables to the connection points:
- Do not force the connectors by pushing too hard or bending them: the contacts may be damaged and system operation may be compromised.



Use ONLY the cables and accessories indicated in the catalog, having technical features suitable for the use to be made of them.

8.2 Wiring connections

The 863T and 873T valves have been designed to be connected to ARAG control devices (computer, monitor, control boxes).

The cables required for the connections are supplied, properly marked, with the control device to be used: always refer to the installation manual of the control device.

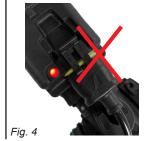
The valve must be connected by means of the connector on the geared motor.

Connect the geared motor connector to the connector of the relevant harness; after making sure it is correctly inserted, press until it locks.

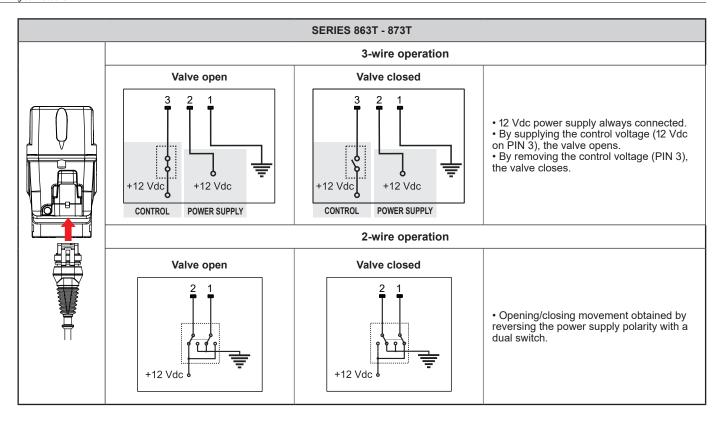


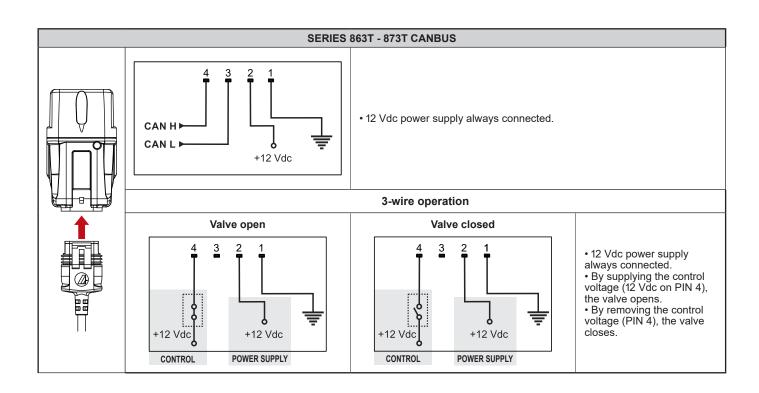
CAUTION: CHECK THAT THE CONNECTOR IS FITTED CORRECTLY TO ENSURE A PROPER SEALING (Fig. 3). If the seal is not positioned correctly, there may be infiltrations of water in the connector and in the valve, with the consequent risk of damage to the device (Fig. 4).





CONTINUES >>>





USE



CAUTION: Do not run light valve for a long time, the inside gaskets could be damaged and the valve could block up.

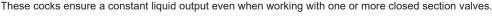
9.1 Controls

- · For details on any operation or adjustment of the valves, ALWAYS refer to the use and maintenance manual of your own control device.
- · Power the valve using a suitable control device (refer to the technical data section for the exact absorption values)

The specifications of A-Net and SAEJ1939 protocols to send commands to the valve can be requested by contacting the ARAG technical support department at the following address: support@aragnet.com.

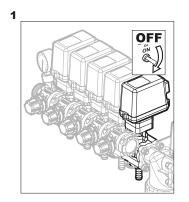
9.2 Calibrating the metered by-passes

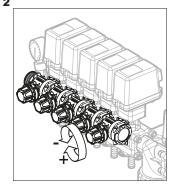


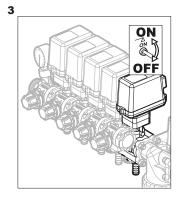




The adjustment knobs of metered by-passes feature a graduated scale. Once each metered by-pass has been calibrated, it is possible to write the values indicated on the graduated scale, according to the nozzle type used, in the tables on page 12. In this way, when using the same nozzles again, it will not be necessary to repeat the adjustment on the metered by-pass, but it will be sufficient to set the by-passes to the values indicated in the tables.







- Activate the hydraulic circuit.
- Adjust the pressure to the predefined working value.
- 1 Close a section valve by activating the corresponding switch on the control device ('OFF' position).
- 2 Adjust the corresponding metered by-pass by turning the knob until restoring the previously set pressure value with all the section valves open.
- 3 Open and close the section valve (by properly activating the corresponding switch on the control device); check that the pressure value remains constant.



If the pressure value changes, repeat the operations in section 2 until no more variations are detected.

4 Adjust ALL the section valves before spraying is carried out; based on the configuration of the control unit, calibration can be performed as follows:

• The number of nozzles is the SAME for all section valves

Carry out the adjustment procedure for one valve only; for all the other valves, position the relevant indicator of the graduated scale at the same

• The number of nozzles is DIFFERENT for each section valve

Carry out the adjustment procedure for each section valve.

• There is a SYMMETRICAL number of nozzles for each section valve (Fig. 5)

Carry out the adjustment procedure only for one side of the control unit (right or left boom, valves A, B, C): to adjust the other boom side, turn the knobs of metered by-passes in the same way, matching the valves (Fig. 5).

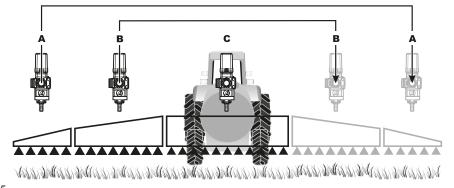


Fig. 5



If the nozzle types are not changed, the adjustments carried out will ensure a constant liquid spreading even for spraying operations to be performed at different working pressures.

9.2.1 Metered by-pass calibration tables

NOZZLE TYPE	COLOR	REF.									
						!			<u> </u>		
NOZZLE TYPE	COLOR	REF.									
NOZZLE TYPE	COLOR	REF.									
NOZZLE TYPE	COLOR	REF.									
NOZZLE TYPE	COLOR	REF.									
NOZZLE TYPE	COLOR	REF.									
NOZZLE TYPE	COLOR	REF.									
NOZZLE TYPE	COLOR	REF.									
NOZZLE TYPE	COLOR	REF.									

DURING THE 10 SECONDS AFTER TURNING ON

9.3 LED signals

A LED positioned on valve connector indicates the relevant status:



3-wire operation					
LED LIGHT COLOR	VALVE POSITION	POWER SUPPLY			
RED	Open	Correct			
YELLOW	Closed	Correct			
OFF		No power supply or reversed polarity			

2-wire operation						
LED LIGHT COLOR	VALVE POSITION	POWER SUPPLY				
RED	Open	Correct				
YELLOW	Closed	Correct				
OFF		Absent				



CanBus operation				
LED LIGHT COLOR		STATUS		
	OFF	The valve is not powered.		
	ORANGE STEADY ON	The valve is being turned on		
	GREEN BLINKING	Waiting to acquire a CANBUS address. After 10 seconds the LED turns green steady on, even if the address has not yet been acquired.		
	GREEN STEADY ON	The valve is configured and working.		
	ORANGE BLINKING	The valve firmware is being updated		
RED BLINKING		ERROR. The error codes are indicated through blinks, which are described in section 11.2.		
0	WHITE STEADY ON	3-wire operation: valve closed		
	BLUE STEADY ON	3-wire operation: valve open		

10 TIME TO SERVICE



PRECAUTIONS FOR MAINTENANCE OPERATIONS AND FOR CLEANING THE EXTERNAL PARTS

- DISCONNECT THE POWER CABLES.
- WEAR SUITABLE PERSONAL PROTECTION EQUIPMENT, OVERALLS, GLOVES AND FACE MASK.
- DO NOT CARRY OUT ANY OPERATION ON THE SYSTEM IF INDOORS OR IN POORLY VENTILATED AREAS.
- DO NOT USE SOLVENTS OR FUEL TO CLEAN THE OUTER SURFACE.
- DO NOT USE AGGRESSIVE DETERGENTS OR PRODUCTS.
- DO NOT USE PRESSURIZED WATER JETS (PRESSURE WASHERS, ETC.).



At the end of each work shift, carry out a washing cycle of the circuit with clean water in the tank.

CAUTION: DISPOSE OF THE LIQUID USED FOR CLEANING ACCORDING TO THE REGULATIONS IN FORCE IN THE COUNTRY OF USE.

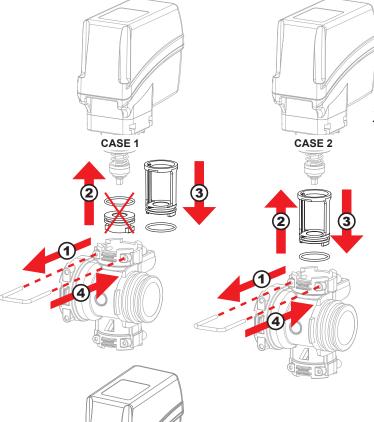
Internal cleaning can be carried out when the system to which the valve is connected is cleaned.

If the maintenance technician needs to open the valve to check the sealing or for extraordinary cleaning, before fitting it back you must replace the seal of the coupling that was opened.



CAUTION: fitting back the valve without replacing the seals can reduce the sealing and therefore cause leaks.

10.1 Section valves



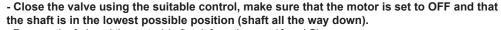
10.1.1 Seal seat replacement

- Remove the fork and the motor/shaft unit from the seat (1 and 2).
- Slide seat and O-ring out and replace them:

CASE 1 valve with seat and O-ring: replace with cage and O-ring. **CASE 2** valve with cage and O-ring: replace with new cage and O-ring.

- Reposition motor/shaft unit (3).
- Reposition the fork.
- Reconnect all the hydraulic connections.
- Restore electric power supply.
- Put the system under pressure ONLY WITH CLEAN WATER and check that the connections are not leaking.

10.1.2 Replacing the shaft or the motor/shaft unit



- Remove the fork and the motor/shaft unit from the seat (1 and 2).
- Unscrew the shaft and replace it (3), or replace the whole motor/shaft unit according to your needs.
- Reposition motor/shaft unit (4).
- Reposition the fork.
- Reconnect all the hydraulic connections.
- Restore electric power supply.
- Put the system under pressure ONLY WITH CLEAN WATER and check that the connections are not leaking.

11 TROUBLESHOOTING

11.1 **SERIES 863T - 873T**



PROBLEM	CAUSE	SOLUTION
The valve leaks or the	Presence of foreign bodies	Make sure there are no foreign bodies; if so, remove them.
seal is not enough Plug seals are worn out		Replace the plug pin.
	Lack of power	Check the connections and the cables. Replace the cable. If the problem persists, contact your nearest Service Center.
	The harnesses are not connected correctly	Check the connections and the cables.
The valve does not work	Power supply voltage is lower than the minimum value	Make sure that the harnesses are suitable for the system
	Overvoltage	• The valve features an internal protection which, in case of overvoltages, automatically stops the operation: reset the valve by cutting the power off for about 20 seconds.
	Geared motor broken	Replace the geared motor.
The valve does not stop at the preset point	Geared motor broken	Replace the geared motor.

11.2 SERIES 863T - 873T CANBUS



PROBLEM	LED STATUS	NUMBER OF BLINKS	CAUSE	SOLUTION
The valve leaks or the seal is not enough	-	-	Presence of foreign bodies.	• Make sure there are no foreign bodies; if so, remove them.
sear is not enough			Plug seals are worn out	Replace the plug pin.
			No power supply.	Check the connections and the cables. Replace the cable; If the problem persists, contact your nearest Service Center.
	Off	-	Wrong wiring harness connection.	Check the connections and the cables.
			Power supply voltage lower than the minimum value.	Make sure that the harnesses are suitable for the system.
			Geared motor broken.	Replace the geared motor.
			The CAN-BUS address assigned to the valve is wrong	Repeat the address assignment procedure.
		-	The sent commands are wrong or have been sent to the wrong address	Check the commands sent by the control device.
The valve does not	Green steady		The connection between valve and control device is faulty or not suitable	Check connections.
respond to commands	Red blinking			Make sure that the harness structure complies with the CAN-BUS 2.0 specifications.
				• Check for the presence and conditions of terminating resistors.
		8 and 9	Abnormal current absorption detected	 Remove the motor and make sure that the shaft can move freely; on the contrary, perform valve maintenance operations or contact your nearest Service Center. Restart the valve.
		4	Problem on motor control circuit	Restart the valve; if the problem persists, contact your nearest Service Center.
		14	Hardware version not supported	Contact the nearest Service Center.
		11	Power supply voltage too high	
The valve works correctly, but the red		12	Power supply voltage too low	Check the operating conditions: under these conditions the valve could not have the appointed performance.
LED blinks	Red blinking	13	Too a high temperature has been detected	the specified performance.

12 TECHNICAL DATA

12.1 863T section valves

SERIES 863T

ELECTRICAL FEATURES

- Valve status LED.
- Internal resettable fuse (disconnect the power supply for 20 seconds to reset).

Power supply voltage
 Protection against polarity inversion
 Protection against short-circuit
 Yes

Absorption @ 12 Vdc 0.5 A (average absorption)

The motor absorbs current only during valve movement

ENVIRONMENTAL FEATURES

Operating temperature
 Storage temperature
 0 °C ÷ +60 °C / 32 °F ÷ +140 °F
 0 °C ÷ +60 °C / 32 °F ÷ +140 °F

PHYSICAL FEATURES

Structure in fiber glass reinforced Nylon®

Internal parts in Delrin® and AISI 303 stainless steel

Seals in Viton®

Version for connection with metered by-passes

On/Off activation time
 0.6 s

Flowrate @ 0.5 bar / 7 PSI
 Maximum operating pressure
 Type
 Type
 DN/OFF
 BY-PASS



SERIES 863T CAN-BUS

ELECTRICAL FEATURES

Valve status LED.

Integrated motor control and management electronics.

Internal resettable fuse (disconnect the power supply for 20 seconds to reset).

Power supply voltage
 Protection against polarity inversion
 Protection against short-circuit
 Yes

Absorption @ 12 Vdc
 Can-Bus connection port
 0.5 A (average absorption)
 speed 250 Kbit/sec

for valve control and diagnostics A-net protocol / Can-Bus protocol

ENVIRONMENTAL FEATURES

Operating temperature $0 \,^{\circ}\text{C} \div +60 \,^{\circ}\text{C} / 32 \,^{\circ}\text{F} \div +140 \,^{\circ}\text{F}$ Storage temperature $0 \,^{\circ}\text{C} \div +60 \,^{\circ}\text{C} / 32 \,^{\circ}\text{F} \div +140 \,^{\circ}\text{F}$

PHYSICAL FEATURES

Structure in fiber glass reinforced Nylon®

Internal parts in Delrin® and AISI 303 stainless steel

Seals in Viton®

· Version for connection with metered by-passes

On/Off activation time 0.6 s

Flowrate 0.5 bar / 7 PSI
 Maximum operating pressure
 Type
 Type
 S0 l/min / 13 US GPM
 20 bar / 290 PSI
 ON/OFF
 BY-PASS



SERIES 873T

ELECTRICAL FEATURES

- Valve status LED.
- Internal resettable fuse (disconnect the power supply for 20 seconds to reset).

Power supply voltage
 Protection against polarity inversion
 Protection against short-circuit
 Yes

Absorption @ 12 Vdc 0.5 A (average absorption)

The motor absorbs current only during valve movement

ENVIRONMENTAL FEATURES

Operating temperature
 Storage temperature
 0 °C ÷ +60 °C / 32 °F ÷ +140 °F
 0 °C ÷ +60 °C / 32 °F ÷ +140 °F

PHYSICAL FEATURES

Structure in fiber glass reinforced Nylon®

Internal parts in Delrin® and AISI 303 stainless steel

Seals in Viton®

On/Off activation time
 0.6 s
 1.8 s

Flowrate @ 0.5 bar / 7 PSI
 120 l/min / 32 US GPM

180 I/min / 48 US GPM (HI-FLOW version)

Maximum operating pressure 12 bar / 174 PSI
Type ON/OFF



SERIES 873T CAN-BUS

ELECTRICAL FEATURES

- Valve status LED.
- Integrated motor control and management electronics.

Internal resettable fuse (disconnect the power supply for 20 seconds to reset).
 Power supply voltage 9 ÷ 16 Vdc

Power supply voltage 9 ÷ 1
 Protection against polarity inversion Yes
 Protection against short-circuit Yes

Absorption @ 12 Vdc
 Can-Bus connection port
 0.5 A (average absorption) speed 250 Kbit/sec

for valve control and diagnostics A-net protocol / Can-Bus protocol

ENVIRONMENTAL FEATURES

Operating temperature
 Storage temperature
 0 °C ÷ +60 °C / 32 °F ÷ +140 °F
 0 °C ÷ +60 °C / 32 °F ÷ +140 °F

PHYSICAL FEATURES

• Structure in fiber glass reinforced Nylon®

Internal parts in Delrin® and AISI 303 stainless steel

Seals in Viton®

• On/Off activation time 0.6 s

Flowrate 0.5 bar / 7 PSI
 120 I/min / 32 US GPM

180 I/min / 48 US GPM (HI-FLOW version)

Maximum operating pressure 12 bar / 174 PSI

Type ON/OFF



13 END-OF-LIFE DISPOSAL

Dispose of the system in compliance with the established legislation in the country of use.

14 GUARANTEE TERMS

1. ARAG s.r.l. guarantees this apparatus for a period of 360 days (1 year) from the date of sale to the client user (date of the goods delivery note).

The components of the apparatus, that in the unappealable opinion of ARAG are faulty due to an original defect in the material or production process, will be repaired or replaced free of charge at the nearest Assistance Center operating at the moment the request for intervention is made. The following costs are excluded:

- disassembly and reassembly of the apparatus from the original system;
- transport of the apparatus to the Assistance Center.
- 2. The following are not covered by the guarantee:
- damage caused by transport (scratches, dents and similar);
- damage due to incorrect installation or to faults originating from insufficient or inadequate characteristics of the electrical system, or to alterations resulting from environmental, climatic or other conditions;
- damage due to the use of unsuitable chemical products, for spraying, watering, crop sprayer or any other crop treatment, that may damage the apparatus;
- malfunctioning caused by negligence, mishandling, lack of know how, repairs or modifications carried out by unauthorized personnel;
- incorrect installation and regulation;
- damage or malfunction caused by the lack of ordinary maintenance, such as cleaning of filters, nozzles, etc.:
- anything that can be considered to be normal wear and tear;
- 3. Repairing the apparatus will be carried out within time limits compatible with the organizational needs of the Assistance Center. No guarantee conditions will be recognized for those units or components that have not been previously washed and cleaned to remove residue of the products used;
- 4. Repairs carried out under guarantee are guaranteed for one year (360 days) from the replacement or repair date.
- 5. ARAG will not recognize any further expressed or intended guarantees, apart from those listed here.
 - No representative or retailer is authorized to take on any other responsibility relative to ARAG products.
 - The period of the guarantees recognized by law, including the commercial guarantees and allowances for special purposes are limited, in length of time, to the validities given here.
 - In no case will ARAG recognize loss of profits, either direct, indirect, special or subsequent to any damage.
- 6. The parts replaced under guarantee remain the property of ARAG.
- 7. All safety information present in the sales documents regarding limits in use, performance and product characteristics must be transferred to the end user as a responsibility of the purchaser.
- 8. Any controversy must be presented to the Reggio Emilia Law Court.

15 EU DECLARATION OF CONFORMITY

The declaration of conformity is available at the website www.aragnet.com, in the relevant section.

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Only use genuine ARAG accessories or spare parts to make sure manufacturer guaranteed safety conditions are maintained in time. Always refer to the Internet address www.aragnet.com



42048 RUBIERA (Reggio Emilia) - ITALY Via Palladio, 5/A Tel. +39 0522 622011 Fax +39 0522 628944 http://www.aragnet.com info@aragnet.com