



"AMDAR" Electronics & Control Ltd.

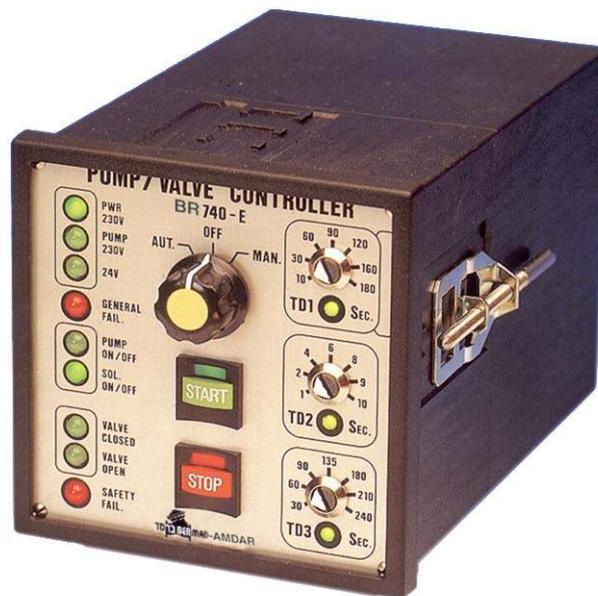
8 BAR-KOCHBA ST. P.O.B 806 BNEI-BRAK, 51108, ISRAEL

Tel. 972-3-6186095 Fax. 972-3-5793139 E.Mail: amd_brsd@netvision.net.il



PUMP & VALVE CONTROLLER

Model BR740-E



The controller is designed to lessen the traveling water shock waves along the pressure lines. This is done by controlling the active Pump & Valve setup.

The different operation modes are selected by the micro-switch settings on the rear panel of the device.

The implementation of such controller is actually a technological breakthrough, compared to the traditional control systems using the conventional control relays, timers and indication lamps.

The following features depict the major advantages of this CPU embedded controller:

- Reliability and Operation Simplicity.
- Minimum down time.
- Significant maintenance savings.
- Software (micro-switch setting) controlled modes of operation.
- Small size (96x96 mm.)
- Simplified troubleshooting process

The above data may be changed without prior notice

/10-1-

In order to simplify and speed up installation, maintenance and/or replacement process, quick connectors are utilized on the rear side of the controller.

In order to achieve the highest possible reliability, the unit is designed to utilize as few components as feasible. Such approach enables to replace the existing systems of older technology, the maintenance cost of that is much higher.

The structure of the controller enables to select the following modes of operation:

- System with N/C valve.
- System with N/O valve and more.

The various operation modes are selected by a set of 8 miniature Dip Switches (consisting of one single unit), called Program Mode Switch. This Dip Switch is located on the rear panel of the controller.

Each basic model (N/O, N/C...) enables to select various modes of operation.

Pushbuttons, Delay Adjustment and LED's

The controller has two pushbuttons, with integrated illumination LEDs:

- **START** -Including the Start-Up procedure green indication LED.
- **STOP** -Including the Shut-Off procedure red indication LED & FAILURE RESET.

The controller has 3 adjustable delays, set by 3 potentiometers: TD1, TD2 and TD3. Each one of the delay functions affects a green LED, illuminating it for the entire delay period. The delay function may vary for each basic model. As an example for the N/C and N/O models it is defined as follows:

- ON DELAY TD1 – Defines the time in which the Valve must open after START.
- OFF DELAY TD2 – Inhibits accidental activation of the L.S. (Limit Switch)
- OFF DELAY TD3 – Defines the time in which the Valve must close after STOP.

In model N/O the TD3 delay defines the activation time of the Valve solenoid

The controller consists of 9 LEDs, arranged vertically on the left side of its front panel, indicating the system operation status (refer to Table No. 1).

Operation Selector

The selector, located on the front panel, consists of 3 modes of operation:

- **AUT** Automatic (Externally controlled) Mode.
- **OFF** Idle Mode.
- **MAN** Manual mode.

Under certain field needs (independent of the controller), the Manual mode of operation has to be overridden.

The above data may be changed without prior notice

/10-2-

Automatic in order to execute this mode of operation, the START, STOP commands must be external, i.e.: originated by floating point contacts of a remotely located controller, computer or switching device and being routed to connector J1, the START command is executed as follows:

- If the Controller was energized, it will be activated after 1 sec. If the controller was not energized and its supply voltage is applied **after** receiving the external START command, it will be activated after a 10 sec. time delay.
- Resetting the controller, after 1 sec. time delay.
- Between failures, automatic restart process after 30 sec. time delay. In case the failure didn't clear yet, the system will try up to 5 times to restart the process.

The external START command may be initiated after any one of the above-described events.

Off Under this mode of operation, the system executes the Shut-Off procedure (if it was activated before), after which it is blocked to receive any sort of commands from any source.

Manual Under this mode of operation the controller activates the system only by his own START and STOP pushbuttons. Any possible START or STOP commands originated by an external device are ignored.

Manual Override – is carried out by setting the No. 4 and 5 switches of the Program Mode Switch to OFF position (refer to Sub Mode 02, upon the controller's rear label).

Under this mode of operation, the controller will only indicate the availability of the following voltages: PWR 230V, PUMP 230V, 24V.

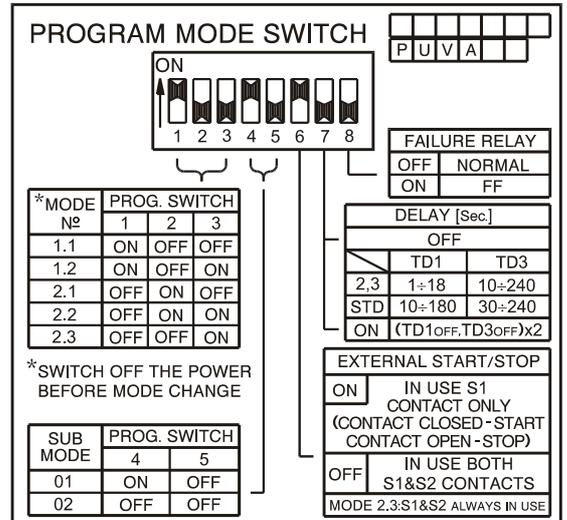
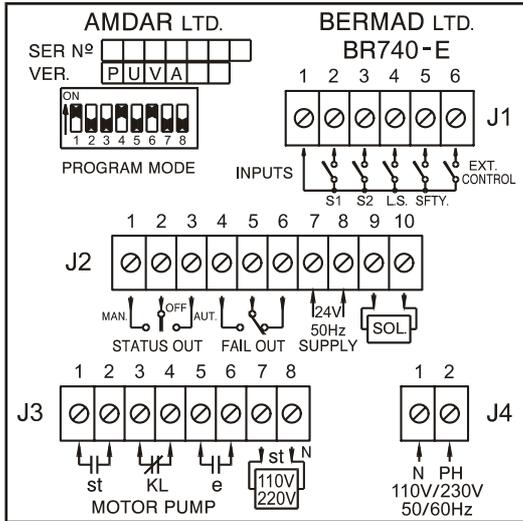
Depressing the START pushbuttons upon the Controller, the LED of the STOP pushbutton will turn on and flash, but neither the pump nor the solenoid will be activated.

In case of the OVERLOAD, OVERTEMP. Or SAFETY failure of the pump, the Controller will turn on the corresponding LED (GENERAL FAIL. SAFETY FAIL) and also will activate the FAIL OUT contacts of the failure relay, All the remaining LED's and the leftover functions will remain inoperative.

ACTIVATION

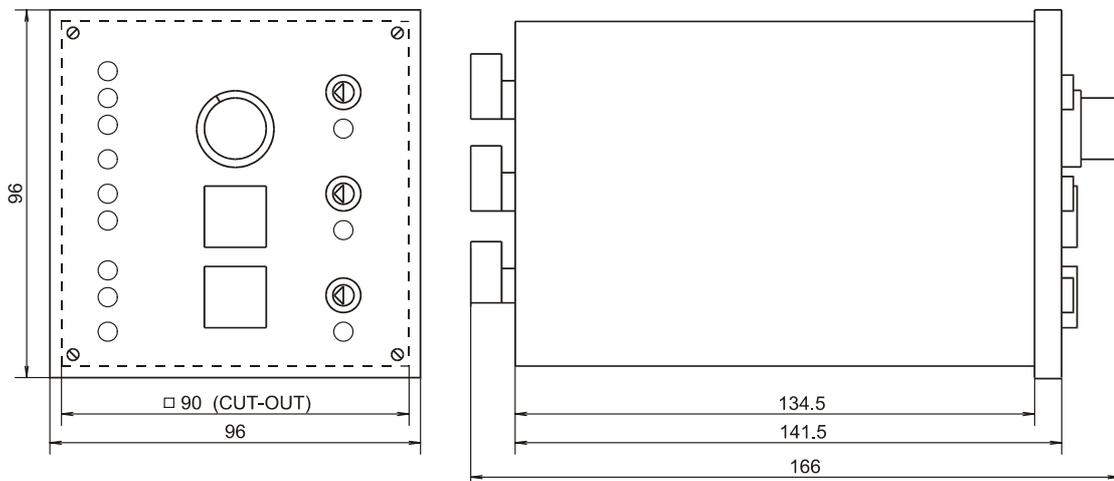
The Pump's Valve is installed on the Pump's tube, (replacing the Non-Return Valve), and is used as the Pump's control valve as well as the deleted Non-Return Valve. The controller governs the Valve's operation in coordination with the Pump, as such eliminating the expected shock wave during Pump activation but mostly at shut-off.

REAR PANEL & PROGRAM LABEL



FAILURE INDICATIONS LED STATUS					
FAILURE LED	INTERNAL FUSE 2A F1 FAILED	INTERNAL FUSE 4A F2 FAILED	PUMP MOTOR FAILURE		
			st CONTACTOR'S AUX CONTACTS	KL TEMP. SENSOR CONTACTS	e OVERLOAD CONTACTS
⊗ OUT 230V /110V	RED ON	—	—	—	—
⊗ 24V	—	RED ON	—	—	—
☼ GEN. FAIL	RED FLASH ⏏	RED FLASH ⏏	RED FLASH ⏏	RED FLASH ⏏	RED FLASH ⏏
☼ PUMP ON/OFF	—	—	RED FLASH ⏏	RED FLASH ⏏	RED FLASH ⏏

EXTERNAL DIMENSIONS (mm.)



The above data may be changed without prior notice

/10-4-

Table No. 1 – operation Status

#	LED	DESCRIPTION & FUNCTION
1	SUPPLY 230V	Green colored, indicating normal supply of power
2	OUT 230V	Two colored, indicating the status of the internal fuse (F1): Green – Normal Red – Failed
3	24V	Two colored, indicating the status of the 24 VAC power supply to the valve's solenoid: Green – Normal. Red – Failed, (24 VAC is not supplied to the solenoid but is supplies to the controller). The internal F2 fuse failed. Off – No 24 VAC is supplied to the controller.
4	GENERAL FAIL	Red colored, indicating a failed controller or incorrect Pump/Valve operation. The internal relay switched FAIL. OUT to J2. Two possibilities for relay activation: A. NORMAL (NO) B. FF (FAILSAFE) Three inputs for Pump protection: A. e - (overload), floating input from the auxiliary contacts of the overload switch. B. KL - (Klixon), floating points of the Temp. sensor. (N/C contacts) C. st - Open floating point contacts. Not later than 9 sec. after energizing the Pump it should close. In case it remains open, the controller will interpret it as a failure. Activation of any one of the above safety circuit will stop Pump and Valve solenoid operations as well as illuminating the "GENERAL FAIL" LED and activating the "FAIL OUT" relay.
5	PUMP ON/OFF	Two colored illumination: Green – Pump activation command (No Failures). Red – Failed safety circuit; The number of the periodic flashing characterized the failure.
6	SOL ON/OFF	Green – solenoid activation command.
7	VALVE CLOSED	Two colored illumination: Green – The Valve is closed and it should be closed. Red – The Valve is closed, but it should be open.
8	VALVE OPEN	Two colored illumination: Green – The Valve is open and it should be open. Red – The Valve is open, but it should be closed.
9	SAFETY FAIL	Red colored, indicating safety circuit failure. The LED illuminates Only if any safety device (Float, Pressure Switch.) is connected to the J1 input connector (SFTY) and its contacts are closed.

The above data may be changed without prior notice

/10-5-

VALVE COORDINATION

Coordination of a Pump/Valve set-up of N/O nature, (i.e.: non powered solenoid – Valve is closed), with the BR740-E controller is carried out as follows:

Activation Process: The activation command is issued only for the Pump.

Shut-off Process: The shut-off command connects the 24 VAC for the valve's solenoid, as such choking it and finally shutting it off.
At the end of the shut-off process, the Valve limit switches turn off the Pump but the solenoid itself receives its normal power supply until the end of the TD3 delay period.

Three options ensure the normal operation of the Pump/Valve set-up:

TD1 – ON DELAY No-Flow protection – In case the Valve didn't open during the activation process, after a predetermined delay (in the range of 10 to 180 sec. or optionally in the range of 20 to 360 sec.) the controller starts the process to shut off the pump. Deactivation of the pump will take place after the time delay set by TD2.

TD2 – OFF DELAY Protection against momentary activation of the limit switches (manual or no-flow initiated). The objective is to eliminate inadvertent Pump shut-off procedure. This delay is adjustable up to 10 sec.

TD3 – OFF DELAY This protection assures shutting off the pump under any conditions even if the normal shut off procedure for the Pump and Valve failed. The shut off procedure will take place after a predetermined delay, (adjustable from 30 to 240 sec.).

EXAMPLE:

Coordination of a Pump/Valve set-up of N/C nature, (i.e.: non powered solenoid – Valve is closed), with the BR740-E controller is carried out as followed:

Activation Process: The activation command is issued simultaneously for the pump as well as for the solenoid. Such procedure assures activation of the Pump simultaneously with the opening of the Valve.

Shut-Off Process: The Shut-Off command disconnects the Valve solenoid's power supply as such choking it and finally shutting it off.
At the end of the Shut-Off process, the Valve's limit switches turn off the Pump after the time delay set on TD2.

The above data may be changed without prior notice

/10-6-

TECHNICAL DATA

Power supply	110V +10% -15%, 50/60 Hz 230V +10% -15%, 50/60 Hz
Power Consumption	Less than 8 VA
Operating Temperature (ambient)	10 to 50° C
Delay accuracy	Less than 10% F/S
External Dimensions	96x96x166 m.
Weight	0.75 Kg.

The output to the Valve's solenoid is protected by a 2A internal fuse.

The output to the Pump's activation contacts is protected by a 1A internal fuse.

Packaged into 96x96 NORYL box as per DIN 43700

“FAIL OUT” Output Relay

Change Over Contacts
Max. current of 2A @ 230 AC/DC under
Resistive load

“STATUS OUT” Contacts

(of the activation selector)

Max. current of 0.15A @ 24VDC under
Resistive load

INPUTS

Connector J1 - Commands

			Pins
1	START	- Dry contacts	(1-2)
2	STOP	- Dry Contacts	(1-3)
3	L.S.	- Dry Contacts	(1-4)
2	SFTY	- Dry Contacts	(1-5)

Connector J2

24 VAC, 50/60 Hz, (7-8)
25-50VA Power Supply

Connector J3 – Motor Protector

st	Contactor's auxiliary contacts	(1-2)
KL	Klixon- Temp. sensor- N/C dry contacts	(3-4)
e	auxiliary contacts from the circuit breaker	(5-6)

Connector J4

110/230 VAC 50/60 Hz, (1-2)
Power Supply for the controller

OUTPUTS

Connector J2

		Pins
1	24 VAC-Command for the solenoid	(9-10)
2	“STATUS OUT”	(1-2-3)
3	“FAIL OUT”	(4-5-6)

Connector J3

230VAC-Command for the ST (7-8)
Contactor's coil
(contactor ST activates the Pump's Motor)

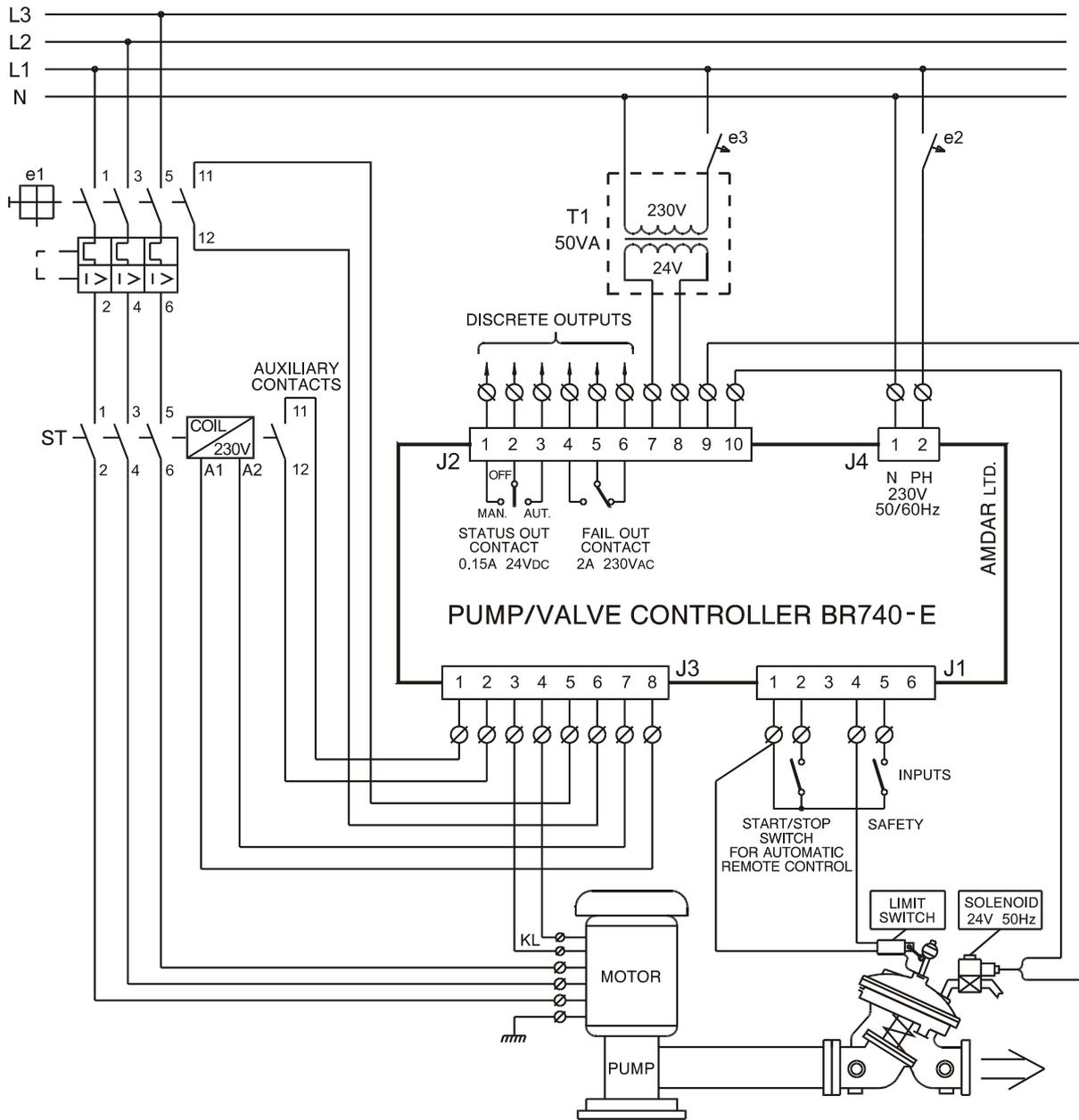
Note:

8/J3 is internal connected to the neutral (N)

The above data may be changed without prior notice

/10-7-

Schematic Diagram for BR740-E controller



Legend:

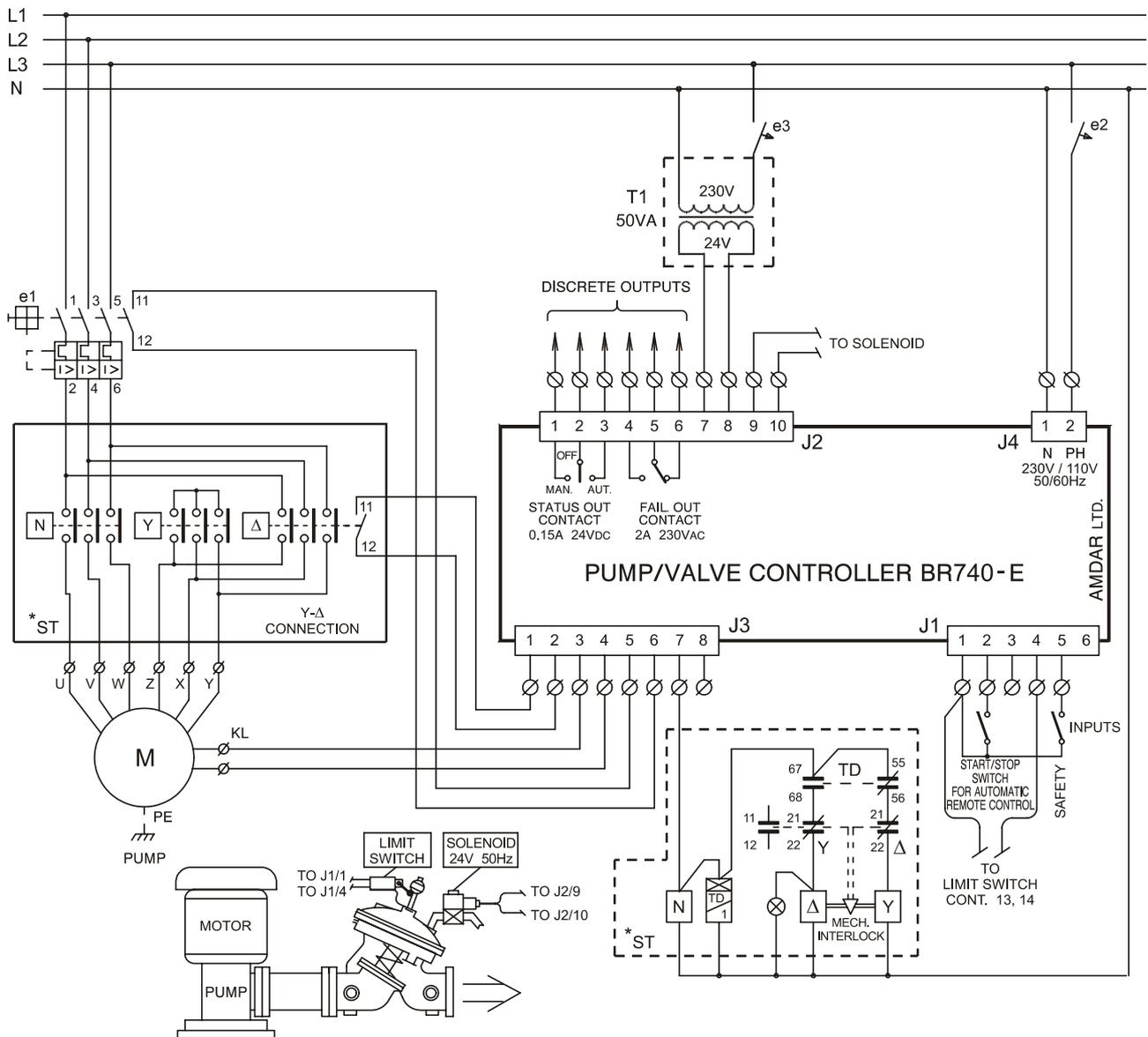
- e1 -Circuit Breaker with overload release, is defined upon the Pump's motor current, like PKZM, GV2 and more.
- e2 -BR740-E controller's current switch, recommended for 6A.
- st -Three phase contactor with auxiliary contacts (NO 11-12). Its power is defined as per the Pump's motor power demand.
- T1 -230/24 VAC (110/24 VAC optional) isolation transformer to energize a single solenoid. Recommended for 50 VA.

WARRANTY

AMDAR warrants the products it manufactures against defects in material and workmanship for a period of one year from the date of the shipment, provided that the product was stored, handled, installed, operated and maintained under proper conditions.

AMDAR's liability extends only to the repair or replace the product at AMDAR's option at AMDAR's premises. This warranty obligation does not cover any transformation charges to and from AMDAR's premises.

Schematic Diagram for BR740-E controller with “Y- Δ” starting motor connection



Remark 1- Use this connection whether the switching time delay between “Y- Δ” connection is less than 9 sec.

Remark 2- In case that the switching time between “Y- Δ” is longer than 9 sec. , the feedback contacts 11-12 to controller’s plug J3 (pins 1-2) should be taken from N contactor (Auxiliary contacts).

The above data may be changed without prior notice

/10-9-