

BRIDGE NAVIGATIONAL WATCH ALARM SYSTEM

Electrical and wiring manual



Prepared for four independent reset inputs and staged alarm outputs. Hardware limits are based on the manufacturer documentation; input/output functions are based on our BNWAS application program.

Device overview	Scope of this document
Power supply	24 V DC
Reset	X0, X1, X2, X3 - four separate momentary buttons
Alarm	Y0, Y1, Y2, Y3 - four cumulative stages
Monitoring	Y4 - energized while settings are valid
Spare terminals	X4-X7 and Y5-Y7
Hardware reference	TP04P-16TP1R / 8 digital inputs + 8 relay outputs

Diagrams use terminal labels. They do not show a rear-view orientation or terminal position numbers. Before installation, check the model on the device nameplate and the actual terminal markings.

Contents: 2 Hardware ratings · 3 Inputs · 4 Reset wiring · 5 Outputs and alarm sequence · 6 Output wiring · 7 Installation and communication · 8 Sources and final checks

01 / MANUFACTURER DATA [1], [2]

Hardware ratings

Parameter	TP04P-16TP1R
Supply voltage range	24 V DC (-15% / +20%); 20.4-28.8 V DC
Consumption / protection	3 W (R model); reverse polarity protection
Undervoltage	Below 20.4 V: operation stops, all outputs OFF
Power interruption	Below 10 ms: continues running; longer loss: outputs OFF; automatic restart when power returns
Insulation resistance	>5 MΩ; I/O-to-ground, 500 V DC test condition
ESD	8 kV air discharge; IEC 61131-2 / IEC 61000-4-2
EFT	Power 2 kV; digital I/O and communication 1 kV; IEC 61000-4-4 / IEC 61131-2
Damped oscillatory wave	Power and digital I/O: 1 kV
Radiated immunity	26 MHz-1 GHz, 10 V/m; IEC 61000-4-3 / IEC 61131-2
Operation / storage	0...50 °C / -20...60 °C
Humidity / altitude	20-90% RH, non-condensing / 0-2000 m
Front panel protection	IP66 / NEMA4X / UL Type4X; indoor use
Vibration / shock	IEC 61131-2; IEC 68-2-6 Fc / IEC 68-2-27 Ea
Dimensions / weight	175.8 × 108.6 × 59.2 mm / 420 g
Cooling	Natural air circulation

3 W / 24 V = approximately 0.125 A, calculated for the device alone. Alarm loads and input currents must be added separately. The insulation test rating is not an instruction to perform a field test on a connected device.

02 / HARDWARE [1] + BNWAS PROGRAM [3]

Inputs and reset functions

Input parameter	Rating
Inputs / common	X0-X7 / S/S0; DC sinking or sourcing
Nominal signal	24 V DC, approximately 5 mA; table specifies $\pm 10\%$
Input impedance	4.7 k Ω
ON / OFF threshold	OFF→ON >16.5 V; ON→OFF <8 V
X0-X1	10 kHz; ON <20 μ s, OFF <50 μ s
X2-X7	60 Hz; approximately 10 ms

Terminal	BNWAS function	Use
X0	Reset 1	Momentary NO button
X1	Reset 2	Momentary NO button
X2	Reset 3	Momentary NO button
X3	Reset 4	Momentary NO button
X4-X7	Spare	No function assigned in the current program
S/S0	Input common	Connect according to the selected input polarity

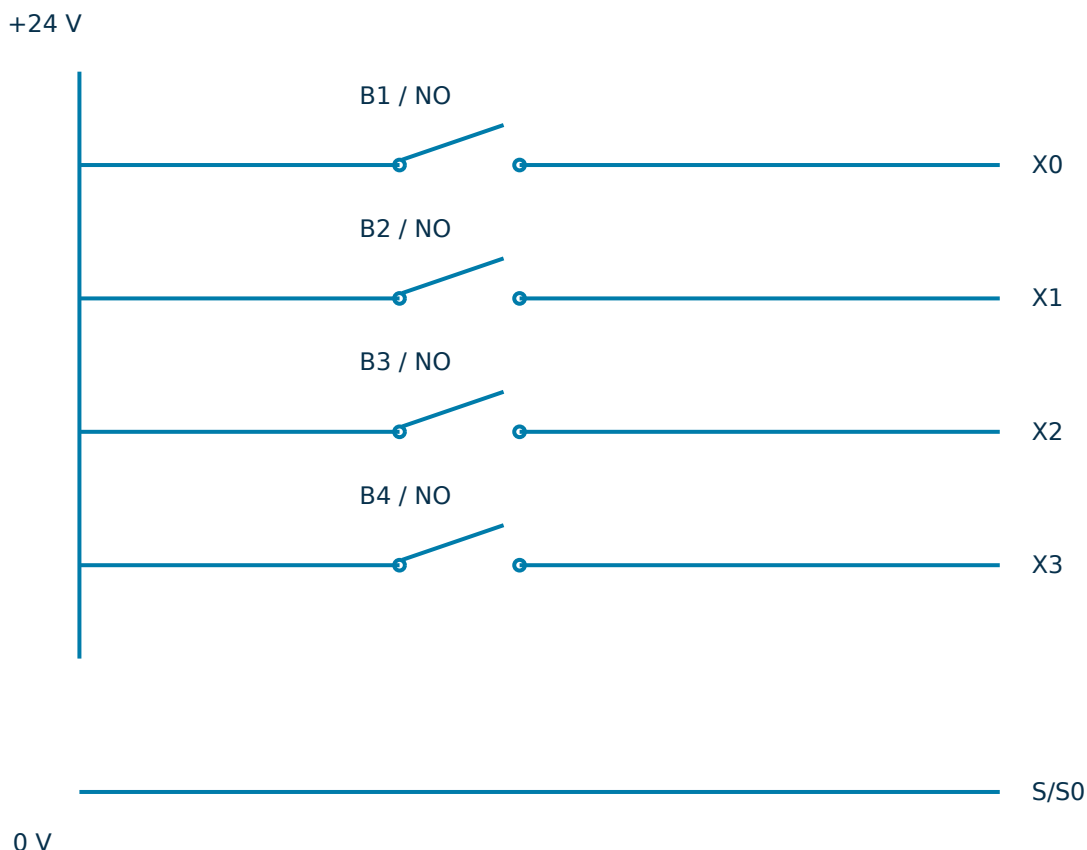
Each new press generates one reset pulse. When one button remains pressed, the timer continues counting and the other three buttons can still reset it. Releasing a button does not generate a reset. An input held at startup must first be released and pressed again. Reset is accepted while the system is enabled and the settings are valid.

The panel command 0 = RESET remains available independently of the physical inputs. Do not connect the four physical inputs in parallel; each button connects to its own X terminal.

03 / EXAMPLE: INPUT ACTIVE AT +24 V

Four reset button wiring

In this example, S/S0 is connected to 0 V. Each normally open (NO), spring-return button applies +24 V to its corresponding X input when pressed. Measure the existing installation polarity before changing any connections.



Connection	Terminal
Device supply +	Power terminal 24VDC
Device supply -	Power terminal 0V
Input common	S/S0 → 0V
Common side of buttons	One side of each B1-B4 → +24V
Button return wires	B1→X0; B2→X1; B3→X2; B4→X3

Alternative: S/S0 → +24 V; the NO buttons apply 0 V to the corresponding X inputs. Do not mix the two methods on inputs sharing one common terminal. The 0 V conductor and protective earth serve different purposes.

04 / RELAY HARDWARE [1] + BNWAS PROGRAM [3]

Outputs and alarm sequence

Relay parameter	Rating
Outputs / common	Y0-Y7 / single common C0
Voltage	250 V AC; DC <30 V (manufacturer contact rating)
Resistive load	1.5 A per output; total 5 A per C0
Inductive load	Refer to manufacturer contact life curves; the resistive 1.5 A rating must not be applied as an inductive load rating
Lamp / response	20 W DC / 100 W AC; approximately 10 ms

Output	Function	Activation time
Y0	Alarm stage 1	At the end of the selected 3-12 minute period
Y1	Alarm stage 2	15 seconds after Y0
Y2	Alarm stage 3	30 seconds after Y0
Y3	Alarm stage 4	120 seconds after Y0
Y4	Settings validity monitoring	Energized in RUN while M60=0
Y5-Y7	Spare	OFF in the current program

Stages are cumulative: when Y3 activates, Y0, Y1 and Y2 remain active. A valid reset clears the alarm stages and restarts the timer. These timings describe the current application software, not a manufacturer hardware function.

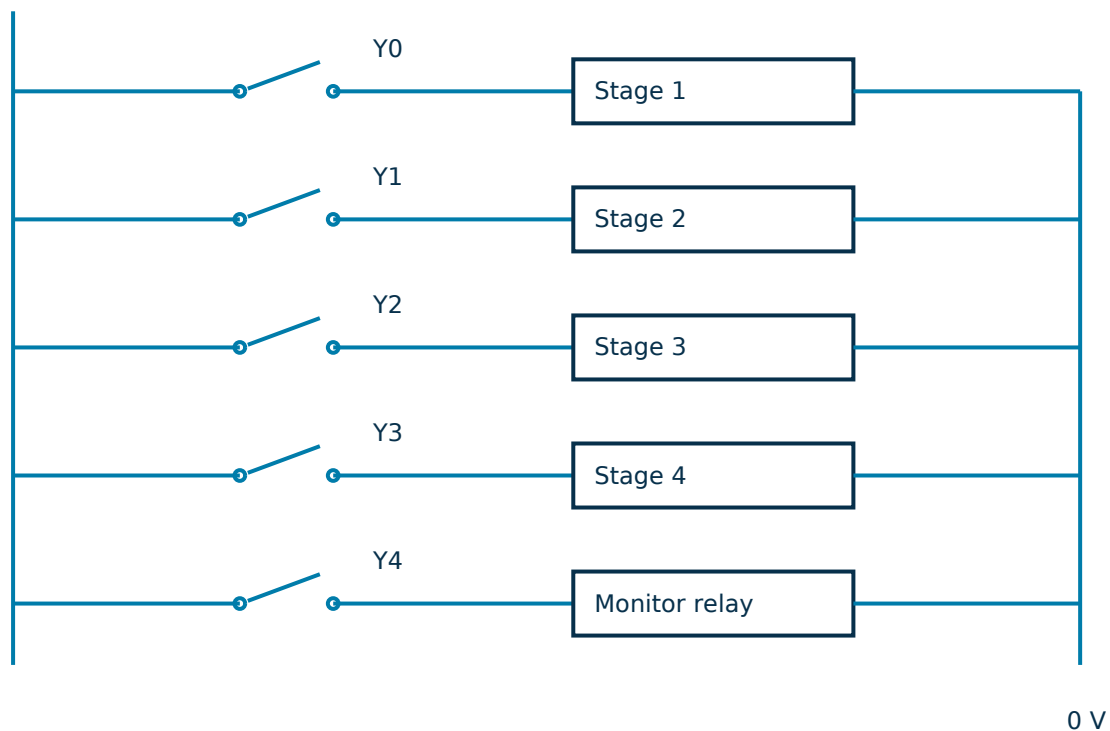
Y4: the C0-Y4 contact closes when settings are valid. It opens on an M60 settings error, STOP or power loss. Y4 monitors settings validity only; it may remain energized while the system is disabled if settings are valid. It does not diagnose every hardware fault.

05 / EXAMPLE: 24 V DC LOADS WITH ONE C0

Alarm load wiring

A relay output does not generate 24 V by itself. The load supply must be connected externally to C0. This drawing is a 24 V DC example only; all Y terminals share the same C0.

+24 V load supply → suitable fuse → C0



Load and contact protection

Assess the total load current with Y0-Y4 energized together. The C0 total must not exceed 5 A, and each resistive load must not exceed 1.5 A. Use suitable interposing relays for larger loads or high inrush currents. Select fuses according to the cable and load characteristics.

For a DC coil, connect a diode across the coil, reverse-biased during normal operation: cathode to (+), anode to (0 V). The manufacturer recommends a diode reverse-voltage rating of 5-10 times the load voltage and a forward-current rating greater than the load current. Do not use this diode arrangement on AC coils; use a suitable suppressor.

Manufacturer AC example: a series 0.1 μ F + 100-120 Ω suppressor. Select component voltage and power ratings for the actual load. Because C0 is shared, independent different-voltage sources cannot be used on these outputs.

06 / INSTALLATION REFERENCE [1], [2]

Installation and communication

Item	Rating / requirement
Panel cutout	162.7-164.0 × 95.5-97.0 mm
Panel thickness	0.5-5 mm
Mounting screw torque	4.75 kgf·cm ≈ 0.466 N·m
Terminal wiring	22-16 AWG; copper, 60/75 °C; ferrule dimension <1.5 mm as shown in the manufacturer drawing
Terminal screw torque	1.90 kgf·cm ≈ 0.186 N·m (1.65 in·lbf)
Grounding	Ground conductor must not be thinner than the supply conductor; ground multiple devices directly
USB	COM1; Type B; PC cable USB A-B
RS-485	COM2 + COM3; removable 8-pin terminal block
Serial communication	9,600-115,200 bit/s; 7/8 data bits, 1/2 stop bits; none/odd/even parity
RS-485 wiring	D+→D+, D-→D-; 120 Ω at both ends; double-shielded twisted pair, 20 AWG recommended
Processor / memory	LPC1787FBD208; 1 MB flash; 64 KB RAM; 8K program steps
Display	Monochrome STN-LCD; 192×64; 101.8×35.24 mm; 4.1 inch
Backlight	1-99 min; 0 = always on; approximately 50,000 hours at 25 °C
Clock / battery	Battery life at -20/0/20/60 °C: 2/2.5/2.7/2.8 years; clock error at 0/25/55 °C: -117/+52/-132 s/month

Front panel protection requires correct sealing and installation; the rear terminals do not share the same IP rating. The enclosure must be dry, clean and ventilated. Route input wiring separately from power/output wiring. Wait one minute after disconnecting power before touching terminals.

07 / DOCUMENT BASIS AND FIELD VERIFICATION

Sources and final checks

Technical sources

[1] Delta Electronics, TP04P Instruction Sheet, TP-014CB30-01, 6 September 2022. English section, printed pages 1-8. Manufacturer-authored document hosted by Mouser. This revision is the basis for the hardware tables.

[Open the manufacturer technical document](#)

[2] Delta TP04P product page and official FAQ 1695: COM2 / COM3 functions and RS-485 support. Accessed: 11 October 2026.

[TP04P product page](#) · [Communication information](#)

[3] Project source: program printout “reset eklemem.pdf”; command screenshots confirming the X1-X3 additions on 11 October 2026 and user-reported tests. Final saved project name: “BNWAS SON 4 reset”. A complete final program printout has not yet been included in this document.

Revision differences and verification limits

Older documents show 3.2 W and 2 A per output. The 2022 revision specifies 3 W and 1.5 A per output for resistive loads; these later values are used here. Check the installed hardware nameplate and revision separately. Hardware test standards are not presented as marine type approval for the completed BNWAS product.

Pre-installation checks

Check	Status
Model nameplate	Compare with TP04P-16TP1R
S/S0 polarity	Measure on the existing wiring
Load currents / fuses	Calculate using the actual alarm loads
Alarm locations	Label the vessel destinations for Y0-Y3 separately
Y4 monitoring circuit	Verify the external circuit detects contact opening
Final program archive	Retain the final four-reset program printout

Reported tests: X1, X2 and X3 reset the timer while X0 was held; X0 worked while X1 was held. Releasing the button did not restart the timer. Testing of every possible held-input combination is not claimed.