T103/T303

MODEL

Unit Controller
Unit Supervisor
Product Data

EUROTHERM

CONTROLS
DATA MANAGEMENT
PROCESS AUTOMATION

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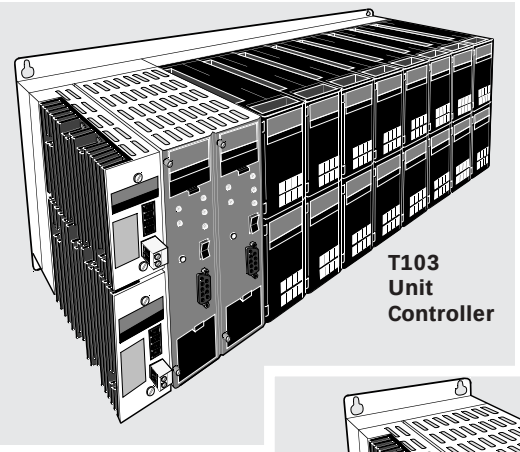
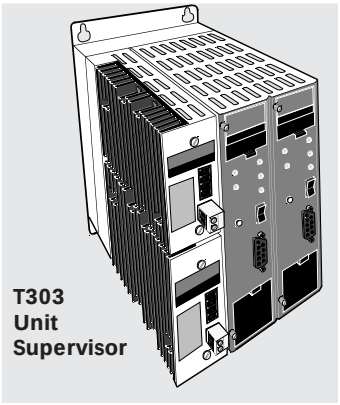
HIGH AVAILABILITY PROCESS CONTROL

- **Distributed Control Units with up to 128 I/O points per node**
- **Full function continuous and sequence control**
- **Redundant CPU option for continuous control with procedureless bumpless takeover**
- **Live replacement of CPU and I/O modules**
- **Unit Supervisor concept in line with S88.01 batch control model**
- **ALIN control network provides peer-to-peer and workstation communications**
- **Direct T640 controller integration**
- **MODBUS communications in simplex units**
- **CE-compliant**



Plug-in redundant CPUs common to both units



General description

The T103 and T303 Control Units form the basis of a complete distributed control environment capable of continuous analogue, logic and sequence control. Evolved from the well-established range of products based on the ALIN control network, they may be used either standalone or as building blocks for larger systems while ensuring complete compatibility with existing installations.

The optional redundancy of CPU and network components combined with proven I/O integrity enables cost effective high availability solutions for process control.

Control systems are built around two main components: the T103 Unit Controller and the T303 Unit Supervisor.

The T103 Unit Controller is an enhancement of the successful T100 and T102 distributed control units. It implements all I/O and continuous analogue and logic control and is available with a powerful sequence option.

The T303 Unit Supervisor complements the T103 in systems where strategy coordination or sequencing of a number of plant sub-systems is required. This architecture maps directly onto the control activity model in the S88.01 standard for Batch Control.

Both units connect to the ALIN local control network which provides both peer-to-peer communications and access for operator workstations and supervisory systems.

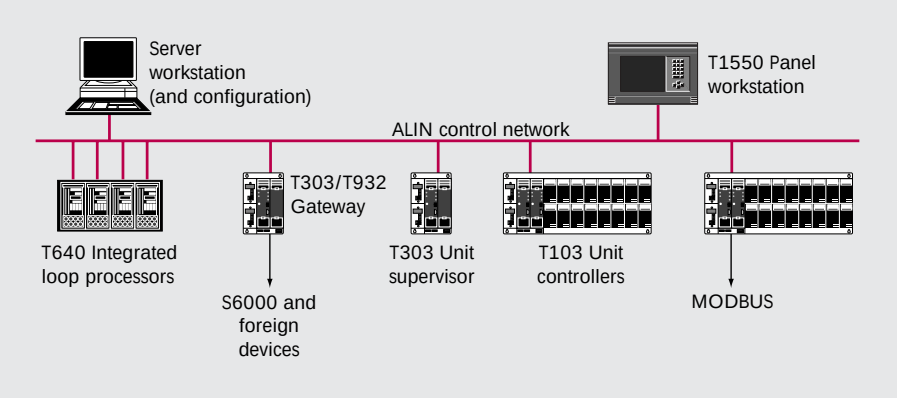
In addition, simplex units support MODBUS serial communications in either master or slave mode, which allows integration of foreign devices such as PLCs or connection to third party systems. A gateway is also available for integrating existing TCS S6000 units.

ALIN SYSTEM ARCHITECTURE

The ALIN control network is the backbone that allows peer-to-peer communications between control nodes and access by operator and configuration workstations.

All nodes appear as part of a coherent distributed database. The database in any element is accessible to any other network element, allowing complete flexibility in strategy interconnection.

The ALIN network uses Cat 5 screened twisted pair cable. The protocol is Acrnet (ANSI/ATA878-1) and a single segment can suport up to 16 nodes over 100m. The network can be extended using active hubs with 8 nodes per segment for systems up to 14km with 254 nodes.

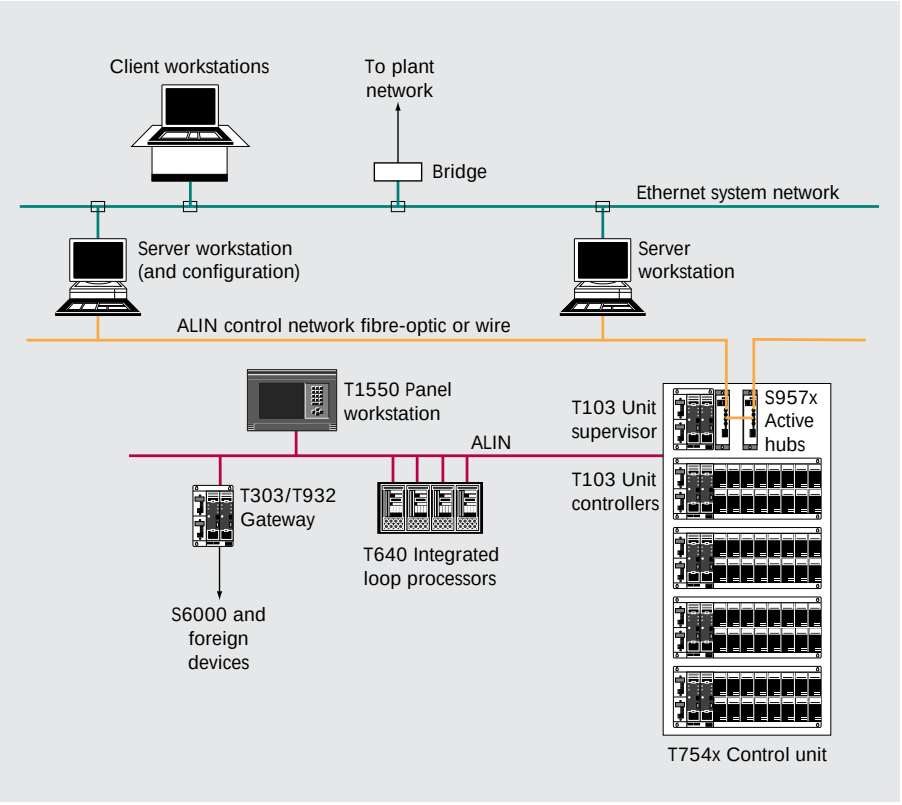


ALIN control network

ALIN network

The ALIN control network supports direct connection of operator and configuration workstations as well as peer-to-peer communications with other units including the T640 Integrated Loop Processor where standalone or panel-mounted controllers are appropriate.

A range of desktop and panel-mounted workstations supports the ALIN network connections.



Extended ALIN control network

Extended ALIN networks

For larger systems ALIN can be extended using active hubs.

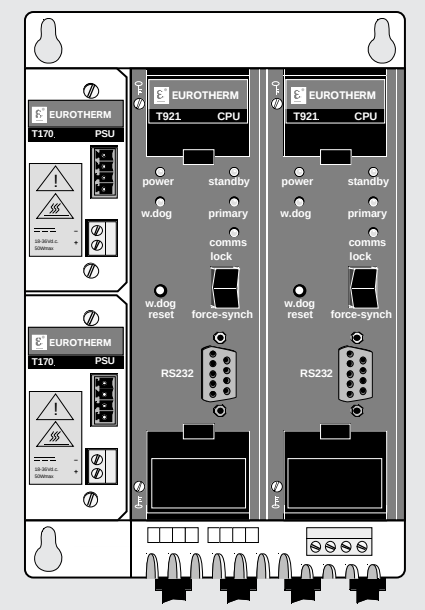
Twisted pair hubs can extend in 122m segments. Fibre-optic hubs can extend the network upto the basic Arcnet limit of 6.7km or 14km with extended timeouts. For more information see HA 084133U 001.

Redundant networks can be achieved using routers.

Serial communications

Foreign devices such as PLCs supporting MODBUS can be readily integrated into the ALIN based architecture by direct connection to T103/T303 control units. The MODBUS communications allows a T303 to be used as a gateway providing access to database elements in any ALIN node. A T303/T932 gateway is also available to interface with Eurotherm Process Automation S6000 instruments. These provide a consistent structure for all I/O and control elements, as well as offering local co-ordination capability.

HARDWARE AND PACKAGING



Control unit chassis and power supplies

The T103 Unit Controller comprises a chassis with one or two CPUs, each with a separate T170 PSU module, and positions for up to sixteen I/O modules. The T303 Unit Supervisor has a short chassis without I/O modules.

CPU options

There are two alternative CPU variants:

T920 – Standard CPU; supports MODBUS via front panel terminal port (DB9 connector)

T921 – High spec CPU with high-capacity filing system; supports MODBUS via dedicated socket on chassis (RJ45 connector)

T932 – High spec gateway to interface S6000 instruments to the ALIN control network; supports all function block types implemented in T921.

CPU redundancy

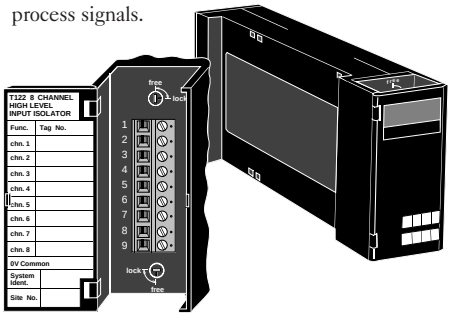
Duplex operation with CPU redundancy is available for continuous control (not with MODBUS or SEQU option) simply by plugging in a second CPU and PSU. The pair of CPUs operates in a primary/secondary configuration, and a high-speed data link between them provides exact tracking of the control database so that takeover by the secondary unit in the event of main CPU failure is bumpless.

Maintenance and diagnostics

A non-active CPU module may be replaced while the system is running, and loads its strategy and current status from the active CPU. Full hardware and software status indication allows rapid verification and diagnostics.

I/O modules and terminations

A wide range of I/O modules caters for most process signals.



All modules are galvanically isolated from the base unit. Termination accessories further extend the interfacing options, and include plug-in relays for digital outputs to facilitate maintenance.

T754x cabinets

A range of standard cabinets covers most common requirements, from wall-mounted enclosures with a single T103 unit to floor-standing cabinets with four T103 units per bay and optional T303 Unit Supervisor with separate termination area.

A T1550 panel workstation or group of T640 Loop Processors may be mounted on the front door if a local operator interface is required.

All versions are pre-engineered and include standard termination units, system and transmitter power supplies. Power supply and distribution components are provided as a subassembly on a mounting plate. This includes LED/relay units for health monitoring, and a battery/charger assembly for RAM backup.

Cabinets may also be supplied with IS barriers for hazardous areas.

Components

The Power Supply subassemblies, Termination Assemblies and ancillary items may be supplied without the cabinet to system integrators and customers with specific installation requirements.

SYSTEM AVAILABILITY AND REDUNDANCY

High availability of the control system is assured by the following features:

Control subsystems

- I/O Modules with 1 to 8 channels maximum with very high field-proven MTBF
- Passive I/O backplane
- Redundant CPU with procedureless takeover and no loss of I/O
- Live replacement of failed CPU, and automatic initialisation
- Extensive health monitoring and diagnostics with watchdog relay
- T640 units may be used as stand-alone/ panel-mounted units

Termination assemblies

- Individual plug-in relays
- Individual fusing and disconnect links

Power supplies

- Redundant system supply

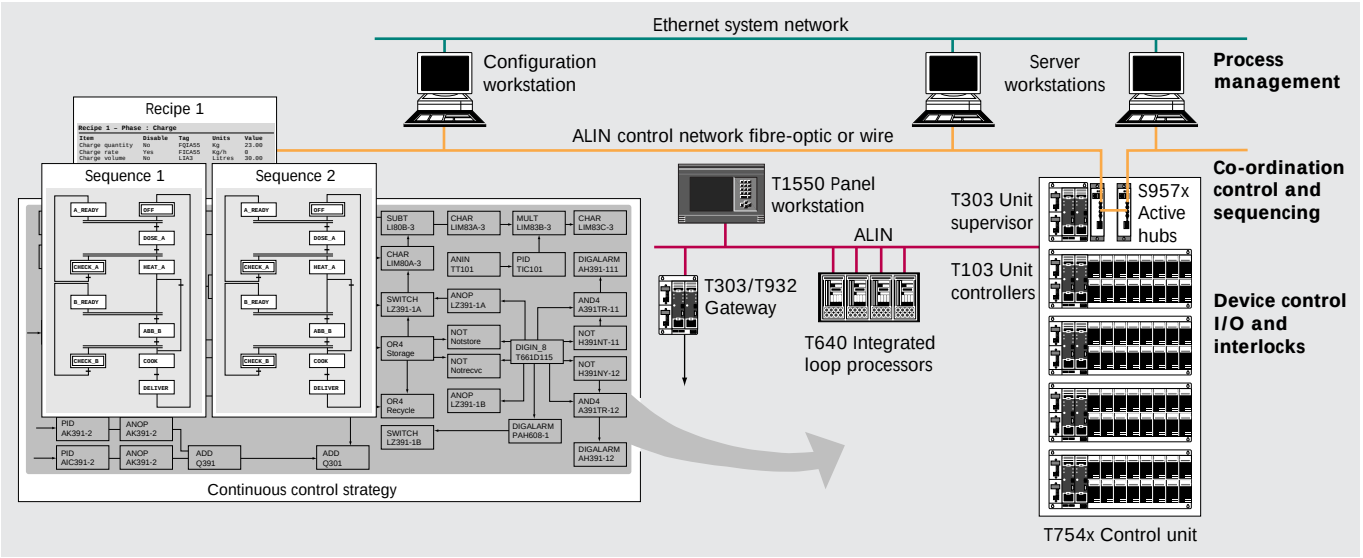
ALIN bridge/router

- Transparent redundancy by duplication

LIN control network

- Existing LIN based systems can be interconnected via bridges.

CONTROL ENVIRONMENT



Scalable Control Units to match process hierarchy

The modular nature and seamless interaction of ALIN based control units allow both physical distribution and adoption of a structured control methodology.

T103 Unit Controllers

The T103 is capable of both basic and coordination/sequence control and is self-contained up to a capacity of 128 I/O points. Larger systems may be implemented by interconnecting multiple T103 units to form a distributed system.

The MODBUS communications, standard in simplex mode, facilitates connection to other equipment.

T303 Unit Supervisor

Large systems or complex sequence and batch applications are treated in a 'layered' fashion by decoupling front-end closed-loop control and its associated I/O and control modules (logical devices) from the main strategy, following the S88.01 standard for batch control. This is achieved by assigning the role of strategy co-ordination to the 'shortbox' T303 Unit Supervisor. The T303, which uses the same CPU as the T103 Unit Controller, provides co-ordination and sequence control of the lower level elements.

The T103 units are responsible for local control loops as well as interlocks and override logic, etc.

The decoupling of front-end and co-ordination control facilitates strategy modification on a running plant, and changes to the Unit Supervisor (or even complete replacement) may be carried out without affecting the operation of loops in the T103 Unit Controllers, which continue to be accessible from the workstations.

The T303 may be used as a dual Unit Supervisor/Gateway by installing two CPUs operating independently in simplex mode.

Continuous and logic control

The continuous strategy is built up by interconnection of function blocks from a rich library of analogue and logic elements.

In addition to fixed function blocks there are ACTION blocks which support user algorithms written in ST (Structured Text) within a standard template. These are particularly appropriate for implementation of control modules to represent physical plant equipment such as valves, pumps and motors, which may be created with standard features – such as discrepancy checking – using the ACTION block.

Sequence control

Sequences act in a supervisory role relative to the continuous database and may thus be loaded and unloaded independently. This is increasingly important for batch sequences, which relate to the process rather than the physical equipment, as these must be changed to meet the requirement of flexible plants.

The capacity of the local filing system allows storage of a large number of sequences. Their operation is controlled through specialised blocks in the continuous database.

Recipes

Recipes are the mechanism by which product-specific data is transferred to the control system. Product recipes may be stored and activated locally in the control unit. Data is stored in RECORD blocks within the continuous database.

Alarms

All system and process alarms are provided with sixteen levels of priority in four categories.

T932 Gateway

The T932 gateway allows existing S6000 systems to be connected up to the powerful Network 6000. To gather information from the S6000 instruments, the T932 communicates using the TCS Bisynch communications protocol. This serial communications link uses an RS422 interface via one of the RJ45 jacks in a T303 chassis. Up to two T932s can be fitted in a T303 chassis. T710 power supplies installed in the chassis provide independent power to the gateways.

The T932 has a block structured database that supports most of the function blocks implemented in a T103/T921 Unit Controller and the T303/T921 Unit supervisor. The T932 also supports the additional blocks required by the S6000 instruments. The T932 can be fitted in either a T103 or a T303 base.

CONFIGURATION

T500/T550 LINtools

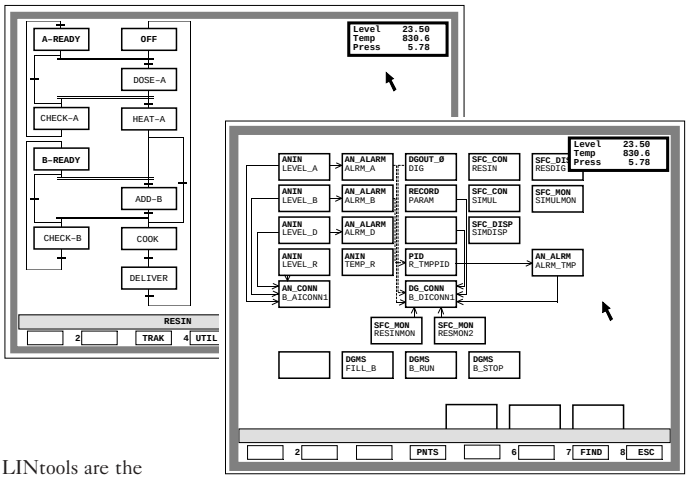
At the heart of Network 6000 is the LINtools configuration and engineering workstation.

LINtools is a comprehensive set of configuration, test, documentation and commissioning tools for strategy elements distributed over the LIN control backbone. The LINtools suite includes graphical configuration of block structured continuous control, sequence control SFCs and graphics for any LIN based product. VIEW allows online monitoring of running databases and flow charts for fault finding.

Documentation and file utilities allow the strategy and graphics to be fully documented and transferred across the network.

A multilevel security system is provided to protect against unauthorised access.

LINtools follows the IEC 1131-3 standard for sequence configuration, while adopting a decoupling of continuous and sequential strategy appropriate to complex process control.



Underlying the design of LINtools are the concepts of simplicity and productivity. Online help, free-format text annotation and area editing are just some of the features included not only to make LINtools easy to use in itself but also to make work done understandable and reusable.

LINtools runs on a standalone or networked PC.

I/O configuration

Standard cabinets may be supplied with a default I/O database allowing immediate testing of plant I/O and a starting point for the user application.

Continuous control

Continuous strategies are configured graphically on screen using 'block structured' techniques implemented across the range of Eurotherm Process Automation instrumentation.

The control configurator supports a comprehensive library of functions together with powerful editing and compound definition facilities. Merging allows the re-use of similar sections of databases avoiding duplication of effort.

Free text may be placed on the screen or attached to function blocks, simplifying descriptive documentation.

Context-sensitive help reduces the need to keep referring to manuals.

Sequence

Sequences are configured graphically using Sequential Function Charts (SFCs) following the IEC 1131-3 standard. Steps initiate Actions which may be Structured Text statements (ST) or nested SFCs. Transitions determine when control passes from one step to the next.

By accessing the continuous control strategy this configurator presents the available points through a menu system, eliminating the need to remember the names of points and reducing the likelihood of typing errors.

Like the control configurator this configurator supports text annotation and context-sensitive help.

Action block

ACTION blocks in the continuous control strategy have their functionality defined in Structured Text (ST) within a standard template. These are particularly appropriate for implementation of plant control modules. The configurator is used to generate reusable structured text definitions.

Control modules

The following standard control modules are provided with T550.

- Vlv1In — On/off valve, 1 input, maintained or pulsed outputs
- Vlv2In — On/off valve, 2 inputs, maintained or pulsed outputs
- Vlv3Way — Three-way valve, 3 inputs maintained or pulsed outputs
- Mtr3In — On/off motor, 3 inputs, maintained or pulsed outputs
- AnManSt — Module analogue manual station
- DgManSt — Module digital manual station
- DutyStby — Duty/standby pair
- Act15A3W — Action block, 15 floating point, 2 word (16 bit) and 2 byte (8bit) fields
- Act8UI8I — Action block, 8 unsigned long integer, 8 signed long integer and 1 byte (8 bit) fields

Additional application and control modules are also available. Contact the sales department for further information.

LINfiler

LINfiler is a powerful utility that lets the engineer see and manipulate files on any filing device accessible to the PC – either a local DOS directory or a LIN or ALIN node. It will also list the contents of local ASCII/text files – without having to quit the utility or return to DOS. LINfiler also allows starting, stopping, uploading and downloading databases. Tagging and wild card facilities assist in the manipulation of multiple files.

Online monitor

Graphical access is provided to any running networked database using the VIEW function. Any continuous control function block may be viewed or built into a diagnostic strategy, thus providing access to all parameters (dependent on security level).

Sequential Function Charts may also be viewed dynamically. This powerful feature allows tracking of active Steps and manual interaction with Transitions.

Documentation

Hard copy documentation consists of the graphical representation of the control strategy supplemented by a listing of the block parameters and connections. Output can be to a printer or in PostScript or AutoCAD compatible file format.

User annotations may be added either directly to graphical screens, or associated with blocks and steps. In this way LINtools provides an electronic documentation environment.

SPECIFICATIONS

Continuous strategy function blocks categories

Note: List excludes Unit Identity (CONFIG) and Diagnostic (DIAG) categories

Category	Block	Function
I/O	AN8_OUT	Analogue output channels, 8-way
	ANIN	Analogue input channels
	ANIN_6	Analogue input channels, 6-way
	ANOP	Analogue output channels
	DGIN_1	Digital input channel, 1-way
	DGIN_8	Digital input channels, 8-way
	DGOUT_8	Digital output channels, 8-way
	FREQIN	Frequency output
	FULL_TC8	Thermocouple input
	RTD	Temperature reading analogue inputs
	RTD_6	Temperature reading analogue inputs, 6 way
	TCOUPLE	Temperature reading analogue inputs
CONDITN	AGA8DATA	AGA8 calculation block
	AN_ALARM	Alarm, with Absolute/Deviation/Rate alarms
	CHAR	16-point analogue characteriser
	DIGALARM	Digital alarm
	FILTER	First order filter
	FLOWCOMP	Computes flow-rate, corrected for pressure, temperature, and density
	GASCONC	Natural gas concentration data block
	INVERT	Inverts signal about HR, LR limits
	LEADLAG	Lead-lag
	LEAD_LAG	Lead-lag/Filter
	RANGE	Re-ranges an analogue input
	UCHAR	16-point characteriser for analogue input block
CONTROL	3_TERM	Incremental form of the PID block
	ANMS	Analogue manual station
	AN_CONN	Analogue connections
	DGMS	Digital manual stations
	DG_CONN	Digital connections
	MANSTAT	Manual station, with connections to front panel display
	MODE	Control mode selection, with pushbutton masking
	PID	PID control function
	PID_LINK	PID linking block
	SETPOINT	Generates a setpoint, with bias, limits, and alarms
	SIM	Simulates up to 9 fields as EEPROM 'tepid data' at power-down
TIMING	DELAY	Delay for deadtime applications
	DTIME	Delay, for deadtime applications
	RATE_ALM	Up- and down-rate alarm applied to PV, with OP held at last non-alarm value
	RATE_LMT	Rate-limiter and ramp generator
	SEQ	Multi-segment slope/level/time, 15 O/P digitals
	SEQE	SEQ extender
	TIMEDATE	Clock and calendar event
	TIMER	Timer
	TOTAL	Totaliser (integrator) for analogue variable
	TOTLAL2	Totaliser for analogue variables with additional features
	TOT_CON	Totalisation connections block
	TPO	Time-Proportioning output
SELECTOR	2OF3VOTE	Selects 'best' input from three, by averaging only the within tolerance inputs
	ALC	Alarm collection producing a common logic O/P
	SELECT	Outputs highest, middle, lowest, or median of 2, 3, or 4 inputs
	SWITCH	Single-pole double-throw switch for analogue signals
LOGIC	AND4	4-input AND boolean function
	COMPARE	Indicates greater/less than/equal of 2 inputs
	COUNT	UP/DOWN pulse counter with START/END count target
	LATCH	D-type flip-flop function
	NOT	NOT boolean function
	OR4	4-input OR boolean function
	PULSE	Pulse output, (monostable) function
	XOR4	4-input exclusive-OR boolean function
MATHS	ACTION	Action control, with use of stored variables and elapsed time
	ADD2	Adds 2 inputs
	DIV2	Divides 2 inputs
	EXPR	Free-format maths expression with up to 4 inputs
	MUL2	Multiplies 2 inputs
	SUB2	Subtracts 2 inputs
BATCH	DISCREP	Transmitted/received digital signal-matching to diagnose plant faults
	RECORD	Storage/retrieval of analogue/digital values for runtime use
	SFC_CON*	Sequence (SFC) control, selection, and running
	SFC_DISP*	Display/monitoring/control of remotely running sequence (SFC)
	SFC_M0N*	Sequence (SFC) runtime monitoring

* Supported by SEQU option only

Continuous database resources (default maximum values)

Model	T920	T921/T932
Database memory:	64K bytes	64K bytes
Block capacity (typical, block size dependent):	256	256
EDBs (External database attachments):	16	32

Sequence control resources

Model	T920	T921/T932
Sequence memory		
– Program data:	38K bytes	64K bytes
– SFC resources:	25K bytes	64K bytes
Independent sequence programs simultaneously loadable:	10	28
SFC Actions, including Root SFCs:	50	130
Steps:	160	390
Action associations:	600	1560
Actions:	300	780
Transitions:	225	582
Sequence execution rate (reduces with increasing workload):	10Hz	10Hz

Note: Sequencing is supported by the T103 and T303 in simplex (non-redundant) mode only

ALIN network communications

Network medium:	ArcNet (ANSI/ATA878-1) (screened twisted pair 100Ω)
Network type:	Token bus
Speed:	2.5 Mbit/sec
Max. no. of nodes:	254
Max. no. of nodes/segment:	16 – bus connected within an enclosure 12 – passive hub connected within an enclosure multiples of 8 using active hubs (see HA 084133U 001)
Max. length/segment:	100m, extendible by repeaters

RS232 serial communications (T920 CPU front panel)

Comms medium:	RS232 (3-wire)
Line length:	15m extendible by comms buffer
Units per line:	1 extendible by comms buffer

Note: Use of a comms buffer/isolator is recommended

RS422/485 serial communications (T921/T932 via chassis connector)

Comms medium:	RS422 (5-wire) or RS485 (3-wire)
Line impedance:	120Ω-240Ω twisted pair
Line length:	1220m max at 9600 bits/sec
Units per line:	16 max. (electrical loading) expandable by use of buffers

Note: Use of a comms buffer/isolator is recommended

RS232 diagnostic terminal (CPU front panel)

Terminal type:	ANSI (VT100 etc.)
Data rate:	Auto select 300 to 19,200 bits/sec
Data format:	7 bit, even parity 1 stop

MODBUS/J-BUS

Protocol:	MODBUS/J-BUS RTU configurable master or slave
Data rate:	Selectable 600-19.2k bits/sec
Data format:	8 bit, selectable parity 1/2 stop bits
MODBUS data tables:	16, configurable as registers or bits
Max. table length:	200 registers or 999 bits

Note: MODBUS comms are supported by the T103 and T303 in simplex (non-redundant) mode only

SPECIFICATIONS (continued)

T103/303 CHASSIS AND T170 PSUs

Physical

Dimensions (mm):	
T103	440W × 205H × 141D
T303	135W × 205H × 141D
Weights:	
T103	7.7kg, typical (with 16 I/O modules and 2 CPU/PSUs)
T303	2.0kg (with 2 CPU/PSUs)

Environmental

Storage temperature:	–25 to +85°C
Operating temperature:	0 to 50°C
Relative humidity:	5 to 95 % non-condensing
EMC emission:	EN50081-2 Generic standard (industrial)
EMC immunity:	EN50082-2 Generic standard (industrial)
Electrical safety:	EN61010 (1993) – Electrical equipment for measurement, control and laboratory use
Installation category II:	EN61010
Pollution degree II:	EN61010
Isolation:	BS4743, with isolated I/O as Class II
Vibration:	To meet IEC1131-2 section 2.1.3.1 (0.075mm peak amplitude, 10-57 Hz; 1g, 57-150 Hz)
Shock:	To meet IEC1131-2 section 2.1.3.2 (15g, 11ms)

Power supplies

Input voltage range:	24V dc nominal, permitted range 18-36V – separate inputs for each CPU via T170 PSU
Input isolation	24V dc
Nett power dissipation:	10W per T170/ T920 CPU (15W for T921), plus 40W max. for I/O modules (T103)
Supply rating (T170):	
T103	50W per T920 CPU; 55W for T921
T303	10W per T920 CPU; 15W for T921/T932
Battery backup:	4 to 6 V dc @ 1mA per CPU Maintains memory and realtime clock chip in absence of main supply (Refer to EPA for suitable battery unit)

Switches

ALIN address:	8-way switchbank
Watchdog function:	Selects serial or parallel connection of CPU watchdog relays
ALIN connection to CPU:	Bussed or individual (for use with Hub)

Chassis connectors

ALIN:	2 shielded RJ45 connectors, connectable one per CPU for use with Hub or in parallel for daisy chained bus connection
Serial ports:	RS422/485 via shielded RJ45 connectors one per CPU for gateway comms (T921 only)
User terminals:	4-way terminal block for 5V nom. battery backup input and watchdog relay

T170 PSU connectors

User terminals:	2-way terminal block for 24V dc nom. input Internal supply test points
Diagnostic socket	4-way socket for checking of CPU and I/O module supply

T920/T921 CPU/T932 Gateway

Physical

Model	T920	T921	T932
CPU	80C186 (20MHz)	80C386 (25MHz)	80C386 (25MHz)
RAM*	512K bytes	512K bytes	512K bytes
EPROM (firmware)	1M byte	2M bytes	2M bytes
EEPROM filing)	64/128K bytes	128/256K bytes	128/256K bytes
Serial comms	RS232 via CPU serial port	RS422/485 via chassis (dedicated port)	RS422 via chassis (dedicated port)

*Note: Ext. battery required for RAM backup

Task update time:	100ms	100ms
Supercap (Processor board):	Maintains memory/realtime clock and enables warm start for up to 24 hours in absence of battery backup input	
Supercap (Memory board):	Provides 1-hour memory board power backup during software upgrade (Factory operation only)	
Front panel indication:	5 status LEDs	
Front panel controls:	Watchdog reset pushbutton Redundancy mode control rocker switch	

Serial ports

Terminal configuration/diagnostics:	RS232 via male 9-way 'D'-type connector
Gateway communications:	
T920	RS232 shared with terminal port
T921	RS422/485 link selectable via RJ45 chassis connector

Relays

Watchdog relay:	SPST, 1 per CPU, connectable in parallel or series. Contact rating 24V ac/dc at 500mA, isolation 30V ac rms or 60V dc

Switches

T920 function switches:	4-way switchbank. Selects simplex/duplex operation and startup/test modes

Fuses

CPU fuse:	Customer-replacement, mounted on processor board. 6.3A 20 × 5mm, FF (ultra-rapid) ceramic cartridge
Battery backup fuse:	Factory-replacement only

SPECIFICATIONS (continued)
I/O MODULES

General

All I/O modules share a common bidirectional interface with the main processor

Isolation flash test:	To 4kV
Working isolation voltage:	300V dc or ac rms

Mechanical specification

Dimensions (mm), overall	
single height:	38W × 81H × 117D
double height:	38W × 162H × 117D
Weight	
single height:	0.2kg (typical)
double height:	0.4kg (typical)

Environmental

Operating temperature:	0 to +50°C
Storage temperature:	–20 to +85°C
Relative humidity:	5 to 95% (non-condensing)
EMC emissions:	EN50081-2
EMC immunity:	EN50082-2
Electrical safety:	EN61010 (1993)/A2:1995

I/O module range

I/O Modules	Single or double box	Type	Range	Channel isolation	TX PSU	Nominal update time	Termination assembly auxiliaries (See separate specification)
1-channel resistance thermometer input T111	S	PRT (2/3/4 wire) or Resistance	PT100/Ni20, Cu10 0-1kΩ	—	—	0.1 sec.	
8-channel thermocouple/mV input T112	D[1]	Thermocouple[2]/mV	15mV to ±100mV	Yes	—	1.2 sec.[3]	
6-channel resistance thermometer input T113	D[1]	PRT (2/3 wire) or Resistance	Pt100/Cu10/ Resistance user specified	Yes	—	0.1 sec. all 6 chans	
1-channel analogue input T120	S	V or mA	±1 to ±10V ±20 to ±50mA	—	25V (21.5mA)	0.1 sec.	
8-channel analogue input T122	S	V	0 to 10V	No	—	1.0 sec.	TA122/mA, TA122/mAS
8-channel isolated mA input T123	D[1]	mA	0-20mA	Yes	—	1.2 sec.	
6-channel isolated analogue input T124	D[1]	V/mA	–10V to +10V maximum	Yes	—	0.1 sec. all 6 chans	TA124/mA, TA124mA/ISOL
1-channel frequency/pulse input T130	S	Logic/mA or Magnetic	0.01Hz-30kHz[4] 10Hz-30kHz[4]	—	8/12/24V (21-30mA)	0.1 sec.	
8-channel digital input T140	S	Logic or Contact	1V to 10V 1.1mA	No	24V	0.1 sec.	TA140/DC, TA140/TDC TA140/120V, TA140/230V
1-channel analogue output T150	S	V or mA	0-10V, 0-20mA	—	—	0.1 sec.	
8-channel analogue output T151	D[1]	mA	0-20mA	Yes	—	0.1 sec.	
8-channel digital output T180	S	Logic/ Open Drain	Internal pullup (10kΩ) 5/15/24V	No	—	0.1 sec.	TA180/1p, T180/2p

Notes:

1 T103 has 16 I/O sites: a double height I/O module takes 2 sites

2 T110/T112 thermocouple types J, K, T, S, R, E, B, N, W, W3, W5, Mo, Re

3 T112 update time 2.6 sec worst case with 8 different T/C types

4 5kHz in duplex mode

For further details consult T103 I/O Modules Product Specification

ORDERING INFORMATION

T103 Unit controller order codes

Base code	CPU/PSU & filing	Software options	Base unit identification	Mounting	Factory installation				
T103	T920/T920	CTRL	—	—	—				

Example

Base code	Code
Unit controller base unit	T103

CPU/PSU and filing (Primary/Secondary)	Standard CPU	High Spec CPU
Simplex 64K filing + Modbus	T920/T920B	*not applicable*
Simplex 128K filing + Modbus	T920X/T920B	T921/T920B
Simplex 256K filing + Modbus	*not applicable*	T921X/T920B
Duplex 64K filing	T920/T920	*not applicable*
Duplex 128K filing	T920X/T920X	T921/T921
Duplex 256K filing	*not applicable*	T921X/T921X
Blanking plates only	T920B/T920B	T920B/T920B

Software options	
Control and data acquisition (not T921X)	CTRL
Sequence, control and data acquisition (not T920)	SEQU
Advanced control option	ADVA

Base unit identification	Code
Unit identification (8 characters)	TAG:XXXXXXXX
TAG supplied blank	—

Mounting	
19 inch mounting	19RM
Bulkhead fixing *default*	—

Factory installation	
I/O modules installed	F
Not required	—

Notes: CPU option code calls up T170 PSU.
Sequencing and Modbus are supported in simplex mode only.

T303 Unit supervisor order codes

Base code	CPU/PSU1 & filing	CPU1 software	CPU/PSU2 & filing	CPU2 software	Base unit identification				
T303	T921	SEQU	T920B	—	—				

Example

Base code	Code
Unit supervisor	T303

CPU/PSU1 and filing	
Standard CPU 64K filing + Modbus	T920
Standard CPU 128K filing + Modbus	T920X
High spec CPU 128K filing + Modbus	T921
High spec CPU 256K filing + Modbus	T921X
High spec CPU 128K filing + S6000	T932
High spec CPU 256K filing + S6000	T932X
Blanking plate only	T920B

CPU1 software	
Control and data acquisition (not T921X)	CTRL
Sequence, control and data acquisition (not T920)	SEQU
Advanced control option	ADVA

CPU/PSU2 and filing	Code
Standard CPU 64K filing + Modbus	T920
Standard CPU 128K filing + Modbus	T920X
High spec CPU 128K filing + Modbus	T921
High spec CPU 256K filing + Modbus	T921X
High spec CPU 128K filing + S6000	T932
High spec CPU 256K filing + S6000	T932X
Blanking plate only	T920B

CPU2 software	
Control and data acquisition (not T921X)	CTRL
Sequence, control and data acquisition (not T920)	SEQU
Advanced control option	ADVA

Base unit identification	
Unit identification (8 characters)	TAG:XXXXXXXX
TAG supplied blank	—

Notes: CPU option code calls up T170 PSU.
Sequencing and Modbus are supported in simplex mode only.

T920, T921, T932 CPU order codes when ordered separately

Base code	Software & filing								
T921	SEQU								

Example

Base code	Code
Standard CPU + Modbus	T920
High spec CPU + Modbus	T921
High spec CPU + S6000	T932

Software and filing option	
Control and data acquisition 64K (T920 only)	CTRL
Control and data acquisition 128K	CTRL-XFS
Sequence, control and data acquisition 128K	SEQU
SEQU with high capacity filing 256K (T921 only)	SEQU-XFS
Advanced function with 256K	ADVA

Note: Sequencing and Modbus are supported in simplex mode only.

Caution: RAM backup battery and charger unit are recommended for use with non-secure supply

ORDERING INFORMATION (continued)

T1XX I/O modules

I/O modules	Code
1-channel PRT input	T111
8-channel low level thermocouple input (D)	T112
6-channel resistance thermometer input (D)	T113
1-channel high level analogue input	T120
8-channel high level analogue input	T122
8-channel mA analogue input (D)	T123
6-channel isolated analogue input (D)	T124
1-channel frequency input	T130
8-channel digital input	T140
1-channel analogue output	T150
8-channel 0-20mA analogue output (D)	T151
8-channel digital output	T180
Blank module	T1BB

D = Double height module

Termination assembly auxiliaries

Temperature and low level analogue inputs	Code (within cubicle)	Code (separate unit)
8-way analogue input, individually fused transmitter supply	TA122/mA	LA 082755
8-way analogue input, single fused transmitter supply	TA122/mAS	LA 083450
6-way analogue input, transmitter supplies and burden resistors	TA124/mA	LA 083986
6-way isolated analogue input, transmitter supplies and burden resistors	TA124/mA/ISOL	LA 083987
Digital inputs		
8-way digital input	TA140/DC	LA 083350
8-way digital input with test disconnect	TA140/TDC	LA 083383
8-way mains input opto-isolator 120V	TA140/120	LA 083611U120
8-way mains input opto-isolator 230V	TA140/230	LA 083611U 230
Analogue outputs		
None		
Digital outputs		
8-way relay output (SPCO)	TA180/1p	LA 083451U 008
8-way two-pole relay output (DPCO)	TA180/2p	LA 083608

T103 components supplied separately

Base code	Code (within cubicle)	Code (separate unit)
CPU power supply 24V	T170	
CPU blanking plate (T920/T921)	T920B	
RAM backup battery	S9537	PB 083188
Battery charger unit with health status LED and relay 24V	S9538/24V	LA 083677

Termination units are available as stand-alone items of hardware or mounted within a T754x enclosure by Eurotherm. Please order using the relevant part number as shown.

ALIN/Serial cables

Cable type/ Assembly option	Cable length	Colour identification						
S9508-5/2RJ45	3	—						

Example

ALIN cable type/Assembly option	Code
ALIN category 5 FTP patch cable screened 100Ω	S9508-5
ALIN 1 RJ45 connector + ferrules for screw connectors	/1RJ45
ALIN 2 RJ45 connectors	/2RJ45
ALIN Ferrules both ends	/2FER
ALIN RJ45 to RJ11 ALIN test adapter	/RJ11-45D
No termination	—
Cable length	
Specify length in metres with optional decimal point[1]	XXX
e.g. '99' = 99m, '99.9' = 99.9m	
Colour identification	
Default colour. Consult factory for other colours	—

Serial cable type/Assembly option	Code
Serial RS232 cable 9-way female 'D' type to 9-way male 'D' type	S9501-4
Serial RS422 cable RJ45 to 9-way male 'D' type for T921 to D240 port A	S9502-9
Serial RS422 cable RJ45 to 9-way male 'D' type for T921 to D240/D241 port B	S9502-10
Cable length	
Specify length in metres with optional decimal point	XXX
e.g. '99.9' = 99.9m, '999' = 999m	
Colour identification	
Default colour. Consult factory for other colours	—

Note

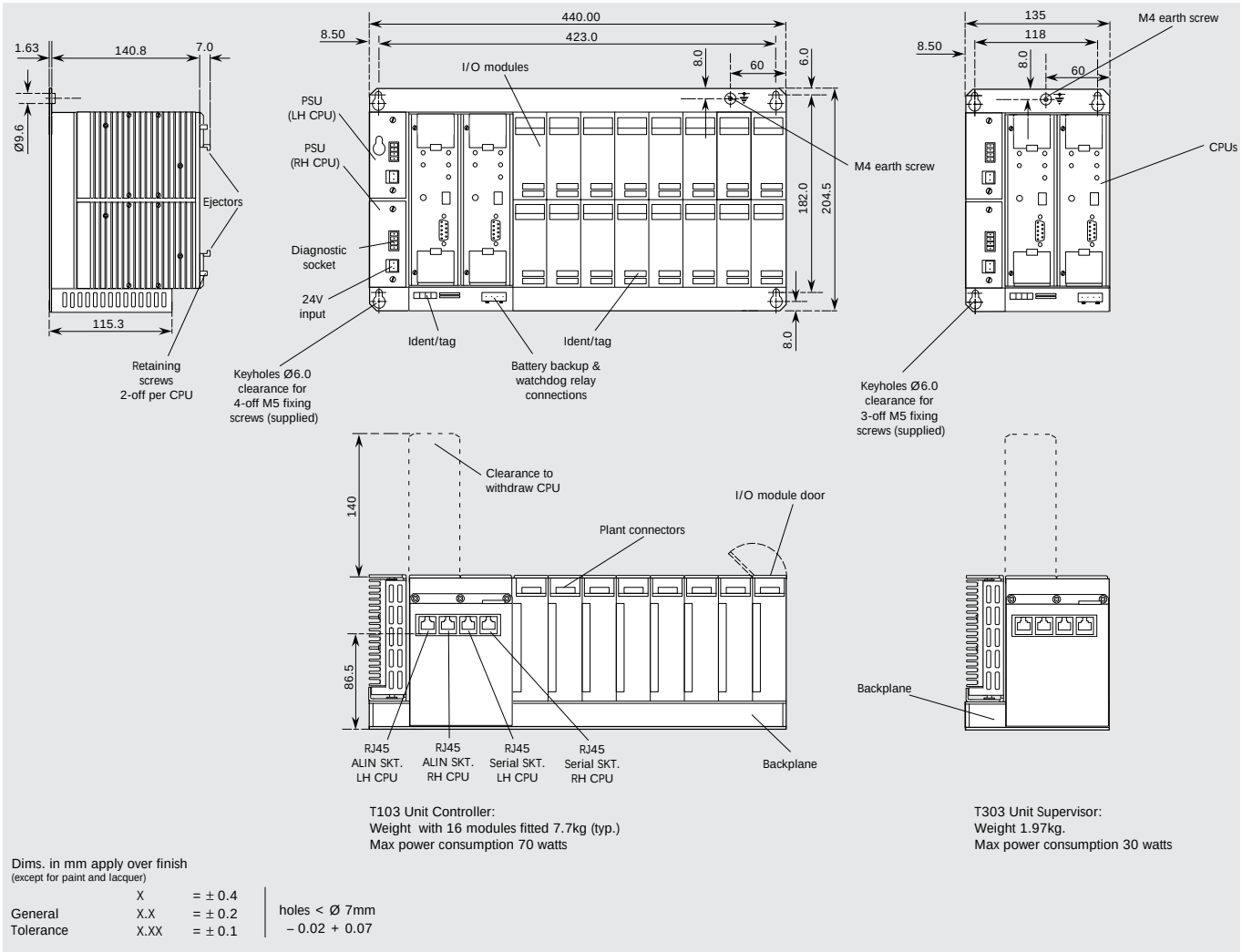
[1] 100m max; 3m if used with ALIN hub

ORDERING INFORMATION (continued)

Cabling auxiliaries

Base code	Code
ALIN terminator RJ45 (100Ω)	LA 249397
ALIN terminator (100Ω), term mounted	LA 082586U 002
RJ45 feed through adapter	CI 250407
Shielded RJ45 connector, unassembled	CI 250449
RJ45 modular connector hand tool	Consult factory
ALIN hub 12-way (RJ45)	S9572
ALIN test adapter 3-way	S9573

INSTALLATION



T103 Unit Controller:
Weight with 16 modules fitted 7.7kg (typ.)
Max power consumption 70 watts

T303 Unit Supervisor:
Weight 1.97kg.
Max power consumption 30 watts

Dims. in mm apply over finish
(except for paint and lacquer)

General Tolerance	X	= ± 0.4	holes < Ø 7mm – 0.02 + 0.07
	X.X	= ± 0.2	
	X.XX	= ± 0.1	

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