

Trend Open Network Node



Description

The Trend Open Network Node (TONN) is a Trend network device that enables the Trend system to interface with 3rd party systems such as BACnet, LONWORKS®, Mbus, MODBUS, SNMP, and KNX. It utilises the Niagara^{AX} Framework® for the integration of Heating, Ventilation, Air Conditioning (HVAC) systems and non-HVAC systems (e.g. lighting) in a building.

TONN reads the required data from the 3rd party systems, and makes it available to IQ3 controllers. Data from the controllers can be made available to the 3rd party systems to provide a single supervisory option.

There are two variants of the TONN Trend driver; Lite and Enhanced.

The Lite variant of the Trend driver enables values from the Trend system to be read and written by the 3rd party systems connected to the TONN, and for the Trend system to read values from and write values to the 3rd party systems.

The Enhanced variant of the Trend driver offers the same features as the Lite variant plus the ability for 3rd party systems to access data logged in Trend IQ controllers, receive alarms from the Trend system, and adjust time zones in the Trend system.

The TONN hardware is available in two different variants TONN 2 and TONN 6. The TONN 6 has more cache memory a faster processor, and operates without the need for an integral battery.

Features

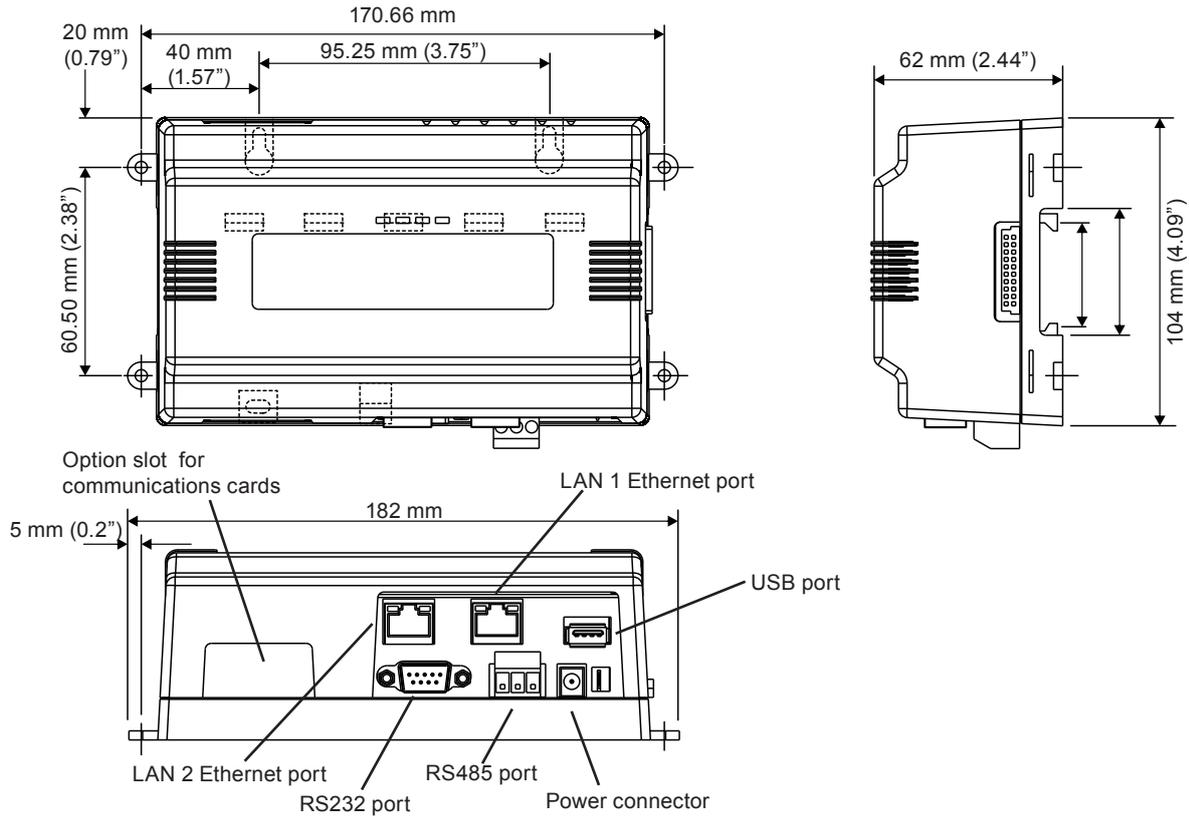
- Supplied with Trend Lite Driver.
- Read and write Trend system values from/to 3rd party systems.
- Supplied with drivers for BACnet IP, BACnet MSTP, EIB/KNX IP, LONFTT, LON IP, MODBUSRTU Master, MODBUSRTU Slave, MODBUSTCP Master, MODBUSTCP Slave, Mbus Serial, Mbus IP, oBIX, and SNMP systems.
- Additional optional drivers available: Flex over RS232 or RS485, Micros Fidelio hotel room booking system (IP), Global Cache, Horstmann serial, Helvar serial, Am Auto-Matrix PHP over RS232 or RS485, Am Auto-Matrix PUP over RS232 or RS485.
- Read and write values from 3rd party systems.
- DIN rail or surface mounting.
- 2 Ethernet ports, 1 x RS232 port, and 1 x RS485 port.
- Up to 2 optional plug in communications cards for RS232, LON FTT, and RS485.
- 15 Vdc power supply.
- TONN 6E - Includes data recovery services for battery less operation. However, the TONN 6E can still be installed with an optional battery and can provide up to 10 minutes of operation during power outages and disturbances if equipped.

Trend Enhanced Driver

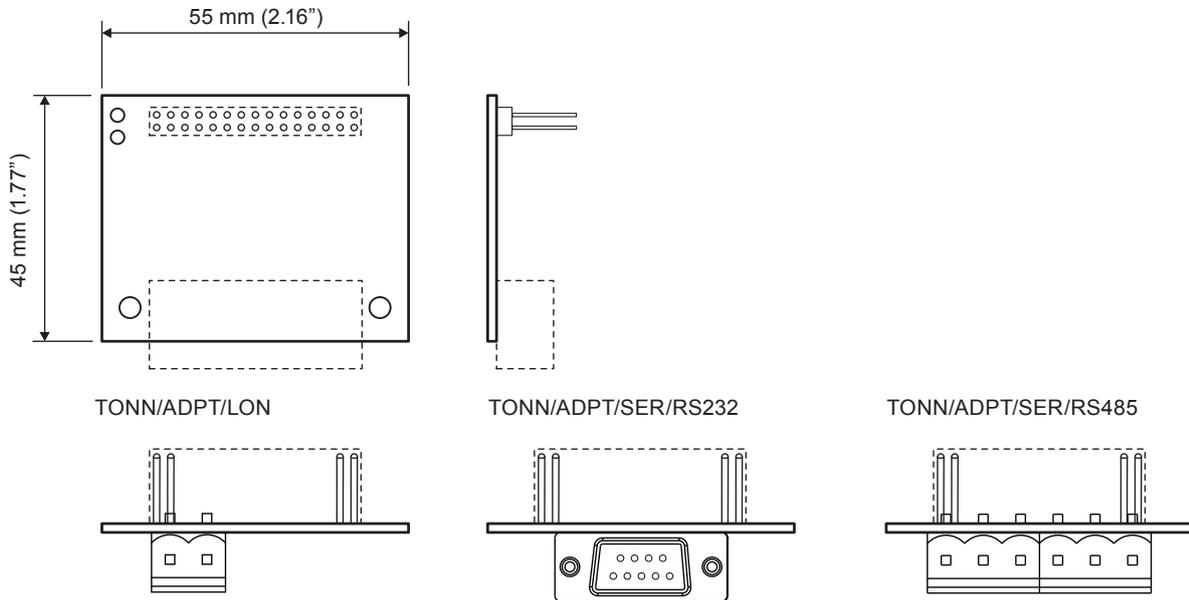
- Access to Trend logged data from 3rd party systems.
- Reception of alarms from the Trend system by 3rd party systems.
- Adjustment of Trend time zones by 3rd party systems.

Physical

TONN

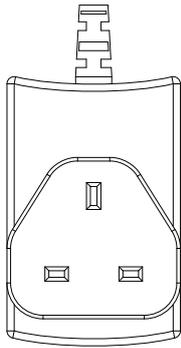
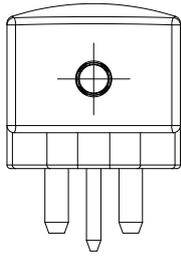


Communications Cards



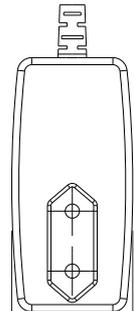
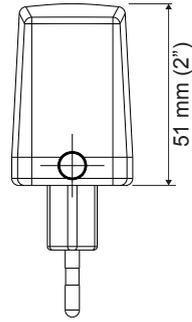
Physical (continued)

PSR230/15VDC/PLUG/UK

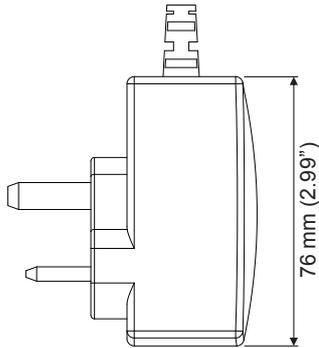


50 mm (1.97")

PSR230/15VDC/PLUG/EU

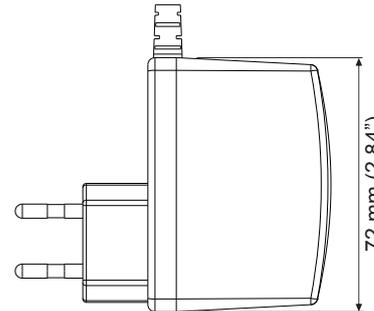


35 mm (1.39")



33.6 mm (1.32")

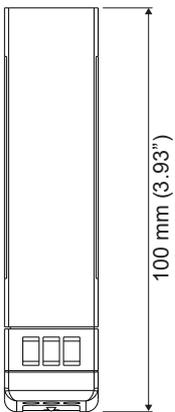
76 mm (2.99")



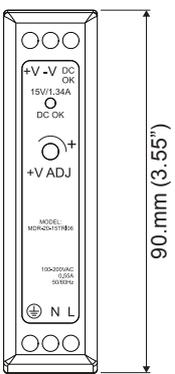
72 mm (2.84")

51 mm (2")

PSR230/15VDC-1.3

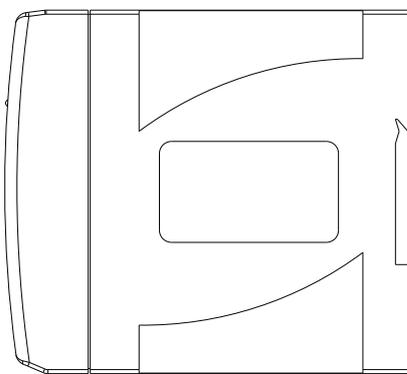


100 mm (3.93")



22.5 mm (0.87")

90 mm (3.55")



FUNCTIONALITY

The functionality of TONN can be divided into three sections [System](#), [Drivers](#) and [Hardware](#).

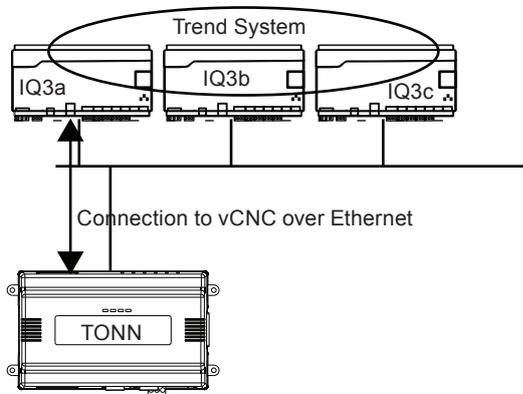
SYSTEM

TONN is a Trend network device that enables the Trend system to interface with 3rd party systems. It incorporates the Niagara^{AX} framework and provides access to the Niagara Open drivers enabling it to interface with the Trend System plus a number of different systems such as BACnet, LonWorks, Mbus, MODBUS, SNMP, and KNX. The TONN hardware is supplied with a Trend driver which provides access to the Trend system. This driver is available in two variants Lite and Enhanced, see below for functional details.

Trend Lite Driver

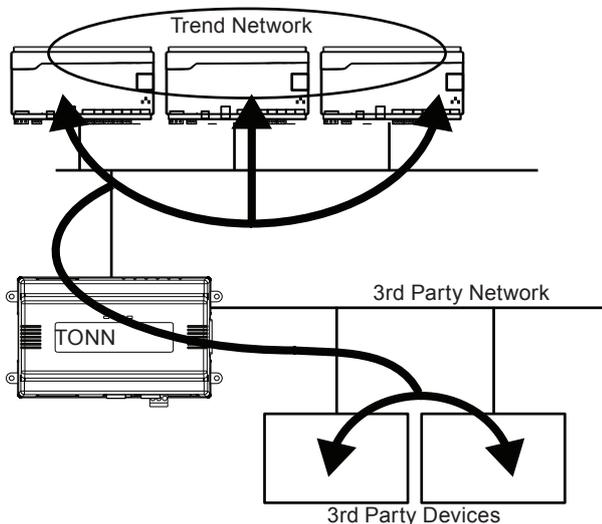
The Trend Lite driver enables values from the Trend system to be read and written by the 3rd party systems connected to the TONN, and for the Trend system to read values from and write values to the 3rd party systems.

The driver has two connection options which enable it to discover the devices and values on the Trend system. The Trend/Serial driver enables communication with the Trend system using a serial connection. The Trend/IP driver enables communication with the Trend system using TCP/IP.



In the diagram above the TONN is connected to the IQ System over Ethernet using a vCNC in IQ3a. It is able to discover the Trend system including available values (IQ3a, IQ3b, and IQ3c).

TONN connects to both the Trend network and the 3rd party systems with which it is to communicate. It learns the 3rd party systems and sends the required values to an IQ3 controller and the controller stores these values in its strategy in the specified location. TONN can also read values from the Trend system and pass them to the 3rd party systems device that requested them. Adjustments can be made to values in IQ controllers from the 3rd party systems using the TONN which passes the new value to the controller. In a similar way values in the 3rd party systems can be adjusted by changing the associated value in the controller. This adjustment could be made with a Trend supervisor such as 963.

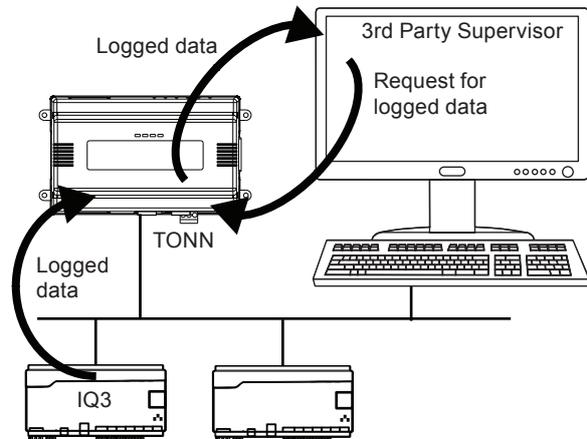


Trend Enhanced Driver

The Trend Enhanced driver offers the same features as the standard variant plus the ability for 3rd party systems to access data logged in Trend IQ controllers, receive alarms from the Trend system, and adjust time zones in the Trend system. This provides the ability to link a Trend system into other building automation systems and provide a single head end (3rd party supervisor).

Access logged data: Data logged by IQ controllers can be accessed by a 3rd party supervisor via the TONN. The TONN must be configured to archive the required logged data from the IQ controller and make it available as a Niagara history. The 3rd party supervisor then requests the data from TONN.

In the diagram on the left the TONN has been configured to archive the logged data from the IQ3. This data is regularly archived by the TONN and stored in a Niagara history. When the logged data is required by the 3rd party supervisor the supervisor requests the data from the appropriate Niagara history in the TONN. The data is then passed from the TONN to the supervisor where it can be processed as required e.g. to display a graph of the data.



Trend Enhanced Driver (continued)

Receive alarms from the Trend system: Alarms from the Trend system can be received and acknowledged from a 3rd party supervisor through the TONN's Niagara framework.

The controller must be configured to either send the alarms to the vCNC that the TONN is connected or to the TONN's IP address and port number it listens for alarms on. The TONN must have its alarm service configured with console recipient. This places the alarms in the TONN's Niagara framework. The TONN and supervisor must then be configured accordingly.

Adjust time zones in the Trend system: Time zones in a IQ controller in the IQ system can be adjusted by a 3rd party supervisor through the TONN's Niagara framework. In order to do this Niagara schedules in the TONN must be linked to time zones in the IQ controller. When the supervisor adjusts the Niagara schedule in the TONN linked to the required IQ time zone the changes are sent to the IQ's time zone.

Connections

TONN Connection to Trend network: TONN connects to the Trend network over Ethernet using either a vCNC in another Trend device, or with a serial connection to a controller's local supervisor port or CNC.

Connection to 3rd party systems: TONN physically connects to the 3rd party systems with any of its available communications ports (2 Ethernet ports, 1 x RS232 port, and 1 x RS485 port). The Niagara Open drivers enable communications with the 3rd party systems. It is then able to act as an interface between the Trend system and the 3rd party systems. If required additional communications ports can be added by fitting up to 2 additional communications cards.

Engineering

TONN is based on the Tridium Niagara^{AX} framework and is engineered using a Trend version of the Niagara^{AX} engineering tool TONN Engineering Suite (TES). Specific Trend TONN Engineering Suite training is available, and attendance of this course is necessary for an engineer to receive a TES license.

To obtain a license for TES a company must purchase the TES Annual Agreement. The TES Annual Agreement enables a VAR to support the TONN products, it provide access to the engineering tool and technical support. Therefore to purchase the TONN related product a VAR must have an active annual agreement in place. To obtained an active agreement order a TES/Annual Agreement, see ['Order Codes' on page 10](#).

DRIVERS

TONN is supplied with the following drivers as standard: Trend/Serial, Trend/IP, BACnet IP, BACnet MSTP, EIB/KNX IP, LONFTT, LONIP, ModbusRTU, MasterModbusRTU Slave, ModbusTCP Master, ModbusTCP Slave, MBus Serial, MBus IP, oBIX, and SNMP.

Trend/Serial: The Trend/Serial driver enables TONN to read and write values from/to the Trend system using a serial connection connected to the controller's local supervisor port.

Trend/IP: The Trend/IP driver enables TONN to read and write values from/to the Trend system using a TCP/IP connection over Ethernet to a virtual CNC in another Trend device e.g. 3xtend/EINC L.

BACnetIP: The BACnetIP driver enables TONN to communicate over an IP network using BACnet protocol. Values can be read from, and written to the BACnet devices.

BACnet MSTP: The BACnet MSTP driver enables TONN to communicate over an MS/TP network using BACnet protocol. Values can be read from, and written to the BACnet devices.

TOPS/TONN Driver

The TOPS/TONN driver is a separate software driver that runs on a PC and allows 963 to connect and monitor TONN devices. It provides live data access, alarm reception from TONN (if configured), historical logged data collection from the TONN (if configured). 3rd party networks and devices are represented in 963 as Non Trend Devices (NTDs) which can be interacted with in the same way as IQ controllers, with a few limitations in functionality. For more details of the TOPS/TONN driver see the TOPS Data Sheet (TA201049).

The TOPS/TONN driver should be used when there are a high number of 3rd party data points required at the 963 as this will significantly reduce engineering time. Alarms can be configured using alarm extensions on the required points on the TONN and sending them to TOPS as an alarm recipient.

Where the number of 3rd party data points is low, there is no need for TOPS provided there are enough modules in the IQ device. TONN can send the points to the IQ strategy modules which can be accessed from 963 in the normal way. Alarms and data logging can be configured on the Trend modules linked to the 3rd party point in the normal way. This method is also recommended for demand and control signals from 3rd party and IQs i.e.. Enable signal from a Trend IQ to a boiler/chiller controller.

EIB/KNX IP: The EIB/KNX IP driver enables TONN to communicate over an IP network using EIB/KNX. Values can be read from, and written to the KNX devices.

LONFTT: The LONFTT driver enables TONN to communicate over a free topology twisted pair network using LONWORKS protocol. Values can be read from, and written to the LONWORKS devices.

LONIP: The LONIP driver enables TONN to communicate over an IP network using LONWORKS protocol. Values can be read from, and written to the LONWORKS devices.

ModbusRTU: The ModbusRTU driver enables TONN to communicate over an RS485 network using Modbus protocol. The driver regularly polls slave MODBUS devices for data using client requests it then makes this information available.

MasterModbusRTU Slave: The ModbusTCP Slave driver enables TONN to communicate over an IP network using Modbus protocol via the TONN's Ethernet port. The driver makes specified values available to MODBUS devices that request the information.

DRIVERS (continued)

ModbusTCP Master: The ModbusTCP Master driver enables TONN to communicate over an IP network using Modbus protocol. The driver regularly polls slave MODBUS devices for data using client requests it then makes this information available.

ModbusTCP Slave: The ModbusTCP slave driver enables TONN to communicate over an IP network using Modbus protocol. The driver makes specified values available to MODBUS devices that request the information.

Mbus Serial: The Mbus Serial driver enables TONN to communicate over a serial connection network using Mbus protocol. It enables monitoring and logging of electricity, gas, water and other parameters via Mbus.

Mbus IP: The Mbus IP driver enables TONN to communicate over a serial connection network using Mbus protocol. It enables monitoring and logging of electricity, gas, water and other parameters via Mbus.

oBIX: The open Building Information eXchange (oBIX) driver enables TONN to communicate using oBIX. Values can be read from, and written to the oBIX devices. The driver meets 'Committee Specification 1.0' using the specification document identifier of obix-1.0-cs-0.

SNMP: The SNMP driver enables TONN to communicate using Simple Network Management Protocol (SNMP). Values can be read from, and written to the SNMP devices. It provides the components necessary to integrate SNMP devices and data into the Niagara environment. The driver supports SNMP version 1 and can be used as either a manager or agent.

When configured as a manager the driver to monitor a network of SNMP devices. The driver can also handle receiving and processing unsolicited SNMP trap messages.

When configured as an agent it serves information to an SNMP manager. It is typically configured to expose data from the TONN (i.e. Trend devices) to the SNMP data requests. It can also generate SNMP v1 trap messages based on Niagara alarms.

In addition to the Open drivers described above which are included as standard other drivers can be ordered separately.

Flex over RS232 or RS485: The Flex over RS232 or RS485 driver provides a generic serial driver that can be configured to communicate to a wide range of simple serial devices over RS232 or RS485. The driver allows the user define the message structures. This includes message framing detail and message payload content. Once messages have been defined they can be used to enable communications to a device. Values can be read from, and written to the devices.

Micros Fidelio hotel room booking system (IP): The Micros Fidelio hotel room booking system (IP) driver enables TONN to communicate over an IP network to a Micros Fidelio hotel room booking system.

Global Cache: The Global Cache driver enables TONN to communicate with audio-visual equipment controlled by infra-red signals over an IP network. Learnt infra-red commands can be loaded into TONN. This enables TONN to send control messages over IP which are translated by the Global Cache module to infra-red. Multiple modules can be controlled by a single TONN for multi-room applications. An infra-red receiver connected by an RS232 port on the Global Cache module can receive infra-red commands and send them back to TONN. This enables TONN to fully control audio-visual equipment.

Horstmann serial: The Horstmann serial driver enables TONN to communicate with Horstmann heating system over a serial connection.

Helvar serial: The Helvar serial driver enables TONN to communicate with a Helvar lighting control system over a serial connection.

Am Auto-Matrix PHP over RS232 or RS485: The Am Auto-Matrix PHP over RS232 or RS485 driver enables TONN to communicate with Am Auto-Matrix PHP products over an RS232 or RS485 connection. The driver is compliant with PHP version 8.10 protocol specifications.

Am Auto-Matrix PUP over RS232 or RS485: The Am Auto-Matrix PUP over RS232 or RS485 driver enables TONN to communicate with Am Auto-Matrix PUP products over an RS232 or RS485 connection. The PUP driver is compliant with PUP version 8.35 protocol specifications.

Protec fire panel serial: The Protec fire panel serial driver enables TONN to communicate with an Protec fire panel over a serial connection.

Resol solar water heating controller serial: The Resol solar water heating controller serial driver enables TONN to communicate with an Resol solar water heating controller over a serial connection.

HARDWARE

TONN

Box: TONN can be DIN rail or surface mounted depending on your requirements.

Power failure protection

TONN 2 The TONN 2's battery allows the TONN to continue operation during short power failures. If a longer failure occurs, the battery provides enough run time (approximately 1 minute) for the TONN to backup data and shutdown. Shutdown occurs automatically, after data is backed up to the on-board flash.

TONN 6E: No battery is required for general operation. TONN 6E includes data recovery services for battery less operation. Using a combination of SRAM and a super capacitor the TONN 6E will provide sufficient power to maintain unsaved station data for up to two weeks in the event of a major power outage. However, the TONN 6E can still be installed with an optional battery which can provide up to 10 minutes of operation during power outages and disturbances, along with longer (3 month) storage of unsaved station data.

Power supply: TONN requires a 15 Vdc supply which must be purchased separately. There are three different power supply options:

PSR230/15VDC/PLUG/UK. A 100-240 VAC, 50/60 Hz power supply that supplies 15 Vdc. It has a 3 pin UK type plug that plugs into a standard wall socket and connects to TONN using a male jack plug.

PSR230/15VDC/PLUG/EU. A 100-240 VAC, 43/63 Hz power supply that supplies 15 Vdc. It has a European type plug that plugs into a standard wall socket and connects to TONN using a male jack plug.

PSR230/15VDC-1.3. A 100-240 VAC power supply that supplies 15 Vdc. It is DIN rail mounting and connects to TONN using a male jack plug using the supplied cable.

Communications Connectors: TONN is supplied with 2 Ethernet ports and 2 serial ports.

Serial TONN has 2 serial ports (RS232 and RS485). Each has a UART capable of operation up to 115,200 baud.

The RS232 port uses a male 9-way D type connector. It always operates as COM 1. Standard 9-way serial cables can be used. TONN is a serial DTE device, if connecting to another DTE device (e.g. PC) a null modem cable is required. If connecting to a DCE device (e.g. modem) a straight-through cable is used. The table below shows the RS232 port's pinouts.

Signal	Pin	Signal	Pin
DCD	1	DSR	6
RXD	2	RTS	7
TXD	3	CTS	8
DTR	4	Not used	9
GND	5		

The RS485 port is a non isolated port which uses a 3 way, screw terminal connector. It operates as COM 2. The connector should be wired with 18 to 22 AWG (0.8 mm2 to 0.33 mm2) 2 wire twisted shielded cable. The terminals (from left-to-right) are shield, plus (+), and minus (-).

Ethernet TONN has 2 10/100 Mbit Ethernet connections (LAN 2 and LAN 1). They use female RJ45 connectors. An activity LED for each Ethernet port is provided on the front cover. Normally only LAN 1 (primary port) is used. Do not use LAN 2 as the primary port.

Indicator LEDs: There are four indicator LEDs 'LAN 1', 'LAN 2', 'BEAT', and 'STATUS' located on the top cover.

LAN 1 and LAN 2 (green). Indicates activity on the LAN 1 or LAN 2 Ethernet port.

OFF	No Ethernet link is present.
ON	Ethernet link is present, but no activity on the LAN.
Flashing	Ethernet link is present with data activity on the LAN.

BEAT (yellow). Indicates if TONN is operating correctly.

OFF	Unit is faulty.
ON	Unit is faulty.
Flashing	Unit OK. If the LED flashes fast (more than once per second) the unit is faulty.

Note that during start up the BEAT LED flashes in a 90% ON 10% OFF pattern. Do not remove power during this time or data loss may result.

STATUS (green). Provides a CPU machine status check.

OFF	Unit is faulty.
ON	Unit OK.
Flashing	Normal operation. If the LED flashes fast (more than once per second) the unit is faulty.

Additional Communications Cards

There are three additional communications cards for TONN which must be purchased separately. A maximum of two additional cards can be fitted into TONN.

TONN/ADPT/LON This is a LON communications card that provides TONN with a FTT-10A LONWORKS® port. A 2 way removable screw-terminal connector plug is provided enabling it to connect to a LONWORKS network. It has two LEDs that are visible on the top of the card (not visible when TONN's top cover is in place):

- RX (green) Receive, indicates that another LONWORKS device is transmitting a message.
- TX (yellow) Transmit, indicates that TONN is transmitting a message on the LONWORKS network.

TONN/ADPT/SER/RS485 This is an RS485 communications card that provides TONN with 2 RS485 communications ports. Each port is optically isolated. A 3 way removable screw-terminal connector plug is provided for each port. It has four LEDs (two for each port) that are visible on the top of the card (not visible when TONN's top cover is in place):

- RX (green) Receive, indicates that TONN is receiving data from a device over RS485.
- TX (yellow) Transmit, indicates that TONN is transmitting a data to a device over RS485.

Links allow the RS485 connections to be biased. This sometimes improves RS485 communications by eliminating indeterminate idle states. Linking for biasing adds two on-board 3.3K ohm resistors into an RS485 port's circuit from RS485 '+' to 5V, and from RS485 '-' to Ground.

When termination resistors are used, RS485 biasing is typically required. RS485 bias resistors are different to termination resistors, externally installed at the two physical ends of a daisy-chained RS485 trunk, across the "+" and "-" terminals. Termination resistors are typically 100 or 120 ohm.

Note only one device on an RS485 trunk should be biased. Otherwise, undue loading of the circuit may result, with fewer devices supported.

Additional Communications Cards (continued)

TONN/ADPT/SER/RS232 This is a RS232 communications card that provides TONN with an RS232 port. A 9-way D type RS232 connector is provided. The card uses its own on-board UART and supports baud rates up to 115200. It has two LEDs that are visible on the top of the card (not visible when TONN's top cover is in place):

- RX (green) Receive, indicates that another device is transmitting a message.
- TX (yellow) Transmit, indicates that TONN is transmitting a message.

The table below shows the RS232 port's pinouts.

Signal	Pin	Signal	Pin
DCD	1	DSR	6
RXD	2	RTS	7
TXD	3	CTS	8
DTR	4	Not used	9
GND	5		

FIELD MAINTENANCE

The Trend Open Network Node requires virtually no routine maintenance.

The battery should be replaced approximately every three years, or more often if the unit is in a high temperature environment.



Warning: Contains no serviceable parts. Opening the unit exposes hazardous voltages.

DISPOSAL



WEEE Directive:

At the end of their useful life the packaging, product, and battery (if fitted) should be disposed of by a suitable recycling centre.

Do not dispose of with normal household waste.
Do not burn.

COMPATIBILITY

3rd Party systems

TONN is supplied with the Trend Lite driver plus drivers for the following 3rd party systems: BACnet IP, BACnet MSTP, EIB/KNX IP, LONFTT, LONIP, ModbusRTU, MasterModbusRTU Slave, ModbusTCP Master, ModbusTCP Slave, MBus Serial, MBus IP, oBIX, and SNMP).

The following additional drivers can be purchased separately: Flex over RS232 or RS485, Micros Fidelio hotel room booking system (IP), Global Cache, Horstmann serial, Helvar serial, Am Auto-Matrix PHP over RS232 or RS485, Am Auto-Matrix PUP over RS232 or RS485, Resol solar water heating controller serial, and Protec fire panel serial.

The Trend Enhanced driver enables a 3rd party supervisor to retrieve logged data, receive alarms and adjust time zones from IQ1 v5.5 firmware or greater, IQ2 controllers, and IQ3 controllers.

Communications Cards

LON communications card (TONN/ADPT/LON), RS485 x 2 communications card (TONN/ADPT/SER/RS485), and RS232 x 1 communications card (TONN/ADPT/SER/RS232).

Trend

TOPS v2.1 or greater with TOPS/TONN driver, 963 using TOPS/TONN driver, read values, from IQ1 v5.5 firmware or greater, IQ2 controllers, and IQ3 controllers. TONN is not able to retrieve data from EMIC's.

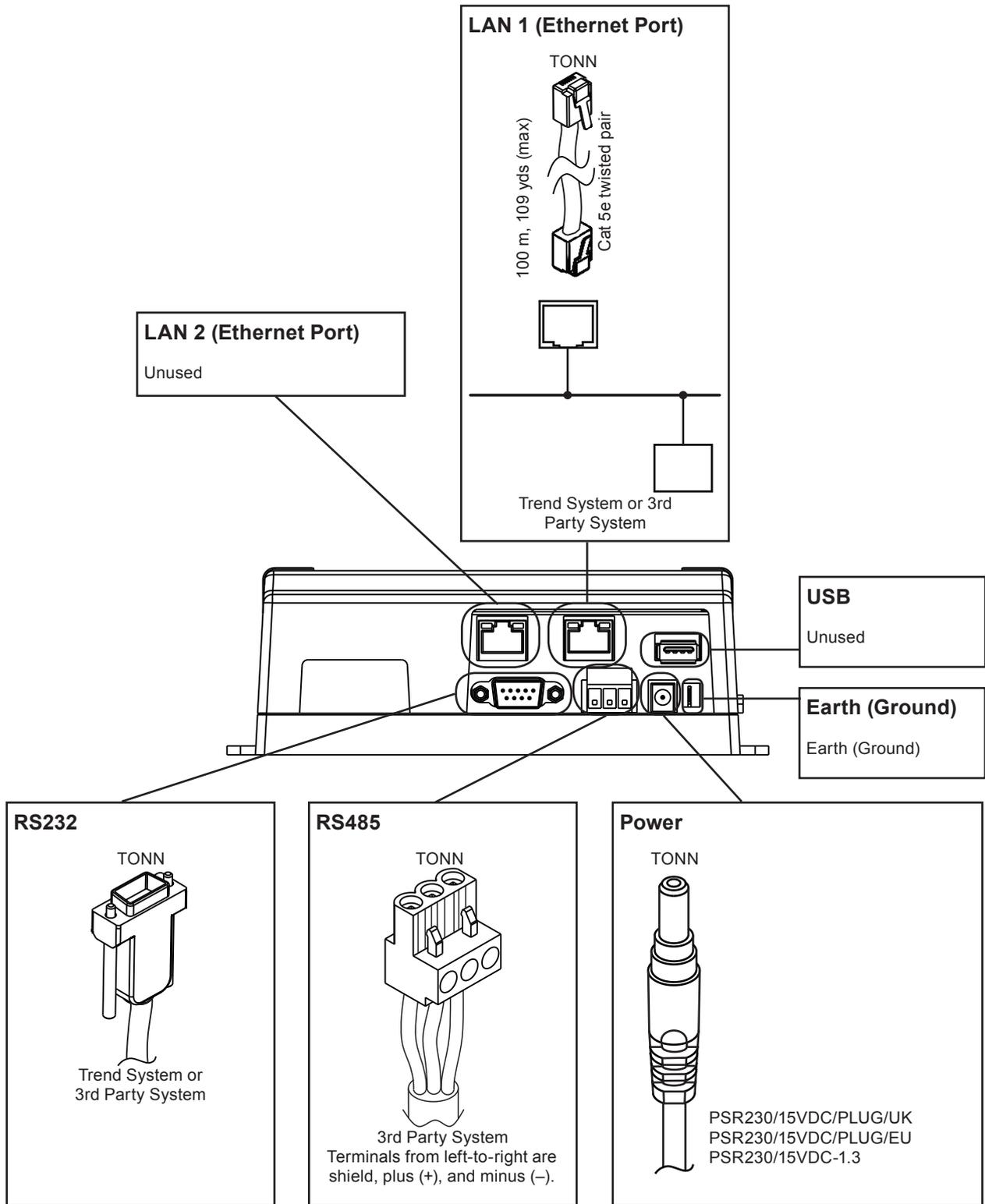
INSTALLATION

TONN is installed on a DIN rail by using the DIN rail clip, inside a cabinet or panel. The procedure involves:

- | | |
|--|---|
| <ul style="list-style-type: none"> Install any additional communications cards Mount in position Connect to Trend network Connect to 3rd Party systems | <ul style="list-style-type: none"> Connect power, do not power up Power up Configure TONN Check correct operation |
|--|---|

This installation procedure is described in detail in the TONN Installation Instructions (TG201128). Installation of the additional communication card is described in the TONN Communication Card Installation Instructions (TG201129). Configuration of TONN is described in TONN Configuration Manual (TE201130).

CONNECTIONS



ORDER CODES

When ordering TONN it is necessary to order the [hardware](#), [power supply](#), [additional communications cards](#), and [additional drivers](#) required. E.g. If for a TONN 6 with 96 MB of memory, a DIN rail mounted power supply, a LON adapter card, and the Flex Driver over RS232 or RS485 it would be necessary to order the following:

TONN/660/15VDC
PSR230/15VDC-1.3
TONN/ADPT/LON
TONN/DRIVER/FLEX/SER

Note that the memory defines the amount of the unit's DRAM available for points and drivers. If required this can be upgraded later by purchasing a memory upgrade.

If the enhanced driver is required you should order as above plus the upgrade to the enhanced driver.

TONN/DRIVER/UP/ENHANCED Upgrade to Trend Enhanced driver.

HARDWARE ORDER CODES

TONN/230/15VDC	TONN 2 with 16 MB of Java heap memory and Trend Lite driver. This is limited to 200 points each for each driver (EIB/KNX = 500 points) with total resource count of 450kRU max.
TONN/240/15VDC	TONN 2 with 16 MB of Java heap memory and Trend Lite driver.
TONN/250/15VDC	TONN 2 with 48 MB of Java heap memory and Trend Lite driver.
TONN/650E/15VDC	Battery less TONN 6 with 48 MB Java heap of memory and Trend Lite driver.
TONN/660E/15VDC	Battery less TONN 6 with 96 MB Java heap memory and Trend Lite driver.

The Java heap memory defines the amount of the TONN's DRAM that is available for points and drivers. If required this can be upgraded later by purchasing a memory licence upgrade.

POWER SUPPLY ORDER CODES

PSR230/15VDC/PLUG/UK	100-240 VAC, 50/60 Hz to 15 Vdc wall power supply with UK type plug
PSR230/15VDC/PLUG/EU	100-240 VAC, 50/60 Hz to 15 Vdc wall power supply European type plug
PSR230/15VDC-1.3	100-240 VAC, 50/60 Hz to 15 Vdc DIN rail mounting power supply

ADDITIONAL COMMUNICATIONS CARDS ORDER CODES

TONN is supplied with two 10/100 Mbit Ethernet ports (RJ45 connector), one RS232 port (9 way D type connector) and one RS485 port (3 way two part connector) as standard. However if required the following additional communications cards can be purchased to provide additional communications ports.

TONN/ADPT/LON	LON communications card
TONN/ADPT/SER/RS485	RS485 x 2 communications card
TONN/ADPT/SER/RS232	RS232 x 1 communications card

Note that a maximum of 2 additional communications ports can be installed in a TONN.

ADDITIONAL DRIVER ORDER CODES

TONN is supplied with the following drivers as standard: Trend/Serial, Trend/IP, BACnet IP, BACnet MSTP, EIB/KNX IP, LONFTT, LONIP, ModbusRTU, MasterModbusRTU Slave, ModbusTCP Master, ModbusTCP Slave, MBus Serial, MBus IP, oBIX, and SNMP). However if required the following additional drivers can be purchased:

TONN/DRIVER/FLEX/SER	Flex Driver over RS232 or RS485
TONN/DRIVER/Fidelio/IP	Micros Fidelio hotel room booking system driver (IP)
TONN/DRIVER/Global_Cache/IP	Global Cache Driver
TONN/DRIVER/Horstmann/SER	Horstmann serial Driver
TONN/DRIVER/Helvar/SER	Helvar serial driver
TONN/DRIVER/AA_PHP/SER	Am Auto-Matrix PHP over RS232 or RS485
TONN/DRIVER/AA_PUP/SER	Am Auto-Matrix PUP over RS232 or RS485
TONN/DRIVER/Resol/SER	Resol solar water heating controller serial driver
TONN/DRIVER/Protec/SER	Protec fire panel serial driver

UPGRADE TO ENHANCED DRIVER

TONN/DRIVER/UP/ENHANCED Upgrade to the Trend Enhanced driver

UPGRADE TONN FIRMWARE

TONN/MEM/UP/LATEST REVISION	Upgrade to Latest Revision of TONN Firmware
TONN/MEM/UP/ONE-REVISION	Upgrade One-Revision of TONN Firmware

TES ANNUAL AGREEMENT

TES/Annual Agreement

TES annual agreement.

The agreement covers one registered company (office) and all satellite offices from this registered office. The Agreement is annual and will need to be renewed by the 1st of February each year. Agreements taken out part way through the year will be charged on a pro-rata basis in full month values. Please note it is not possible to have the TES/Agreement for any other period than that defined above, e.g. from June for two months. If the Agreement was purchased in June, the only option is to have this agreement in place until the following Feb.

TES/Annual Agreement renewals will be sent out January of each year to allow a VAR to send in their PO for the next year's agreement. *Note if the agreement is not renewed the engineering Tool license will expire and it will no longer be possible to receive technical support on these products.*

The agreement entitles the VAR to technical support on the TONN products and any of their engineers who have attended the TOPS/TONN engineering course to apply for TONN engineering Suite Licenses (TES). Please note only one agreement has to be ordered for each VAR, not one per copy of the TES license.

Memory Upgrades

TONN/MEM/UP/230/240	Upgrade of TONN 230 to 240
TONN/MEM/UP/240/250	Upgrade of TONN 240 to 250
TONN/MEM/UP/650/660	Upgrade of TONN 650 to 660

ACCESSORIES

TONN/BAT

The TONN/BAT kit can be used as a replacement battery for TONN 2 units requiring a backup battery for back up and shutdown in the event of power failure. Or it can be used as a Uninterruptable Power Supply (UPS) for TONN 6E which include data recovery services and do not require a battery for normal operation. If installed the optional battery can provide up to 10 minutes of operation during power outages and disturbances.

SPECIFICATIONS

TONN

Electrical

Processor	
TONN 2	IBM PowerPC 250 MHz
TONN 6	IBM PowerPC 524 MHz
DRAM	
TONN 2	128MB (amount available for heap memory dependant on licence)
TONN 6	256MB (amount available for heap memory dependant on licence)
Serial Flash	
TONN 2	64 MB
TONN 6	128 MB
Power requirements	15 Vdc from PSR230/15VDC/PLUG/UK, PSR230/15VDC/PLUG/EU or PSR230/15VDC-1.3
Power failure protection	
TONN 2	:Battery backup - 5 minutes typical. Shut down begins within 10s. Database storage and real-time clock 3 month battery backup. The life expectancy of the battery is 1 to 3 years depending on use and operating environment.
TONN 6	:No battery required for general operation TONN 6E includes data recovery services for battery less operation. However, the TONN 6E can still be installed with an optional battery and can provide up to 10 minutes of operation during power outages and disturbances if equipped.
Communications Ports	
Ethernet	2 10/100 Mbit
RS232	1
RS485	1 non-isolated

Software

Operating System	QNX operating system, IBM J9 Java Virtual Machine, Niagara ^{AX} Framework.
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Indicators

LAN1	Green LED
LAN2	Green LED
Beat	Yellow LED
Status	Green LED

Mechanical

Dimensions	182 mm (7.16") x 104 mm (4.09")(122 mm) x 62 mm (2.44"). Terminals add an additional 18 mm (0.7") to the unit's width. Length includes 20 mm (0.78") for fixing lugs.
Weight	522 g (1 lb 2 oz)
Connectors	
Power	Female jack plug
Ethernet	RJ45
RS232	9 pin D-type
RS485	3 way two part connector with rising cage clamp screw terminals

Environmental

EMC	
Emissions	FCC part 15 Class A, C-tick (Australia) EN61326-1:2006
Immunity	C22.2 No. 205-M1983 "Signal Equipment" EN61326-1:2006
Safety	
EU	EN61010-1:2001
USA/Canada	UL 916 listed open energy management equipment.
Canada	C-UL listed to Canadian Standards Assoc (CSA)
Ambient Limits	
Storage	0 °C (32 °F) to +70 °C (158 °F)
Operating	
With Battery	0 °C (32 °F) to +50°C (122 °F)
*Without Battery	0 °C (32 °F) to +60°C (140 °F)
Humidity	5 to 95 %RH non-condensing
*TONN 6E only without UPS option	

PSR230/15VDC/PLUG/UK

Electrical

Output	
DC Voltage	15 Vdc @ 1.6 A (24 W Max)
Input	
Voltage	100 Vac to 240 Vac @ 0.8 A
Frequency	50 to 60 Hz
Input Current	0.5 A max.

Mechanical

Dimensions	50 mm (1.97") x 76 mm (2.99") x 33.6 mm (1.32").
Connectors	
Input	UK 3 pin plug
Output	Male jack plug

PSR230/15VDC/PLUG/EU

Electrical

Output	
DC Voltage	15 Vdc @ 0.5 A
Input	
Voltage	100 Vac to 240 Vac @ 0.8 A
Frequency	43 to 63 Hz

Mechanical

Dimensions	32 mm (1.39") x 72 mm (2.84") x 51.6 mm (2").
Connectors	
Input	European 3 pin plug
Output	Male jack plug

PSR230/15VDC-1.3

Electrical

Output	
Voltage	15 Vdc @1.34 A
Input	
Voltage	100 to 240 Vac
Frequency range	50 top 60 Hz

Mechanical

Dimensions	22.5 mm (.87") x 90 mm (3.55") x 100 mm (3.93").
Connectors	
Power in	3 way rising cage connector.
Power out	3 way rising cage connector. Supplied lead enables connection with a Male jack plug.

ADDITIONAL COMMUNICATIONS CARDS

Electrical

Communications Ports	
TONN/ADPT/LON	1 LONWORKS FTT-10A LON
TONN/ADPT/SER/RS485	2 optically isolated RS485
TONN/ADPT/SER/RS232	1 RS232

Environmental

Ambient Limits	
Storage	0 °C (32 °F) to +70 °C (158 °F)
Operating	0 °C (32 °F) to +50 °C (122 °F)
Humidity	5 to 95 %RH non-condensing

Mechanical

Connectors	
TONN/ADPT/LON	2 way two part connector with rising cage clamp screw terminals
TONN/ADPT/SER/RS485	3 way two part connector with rising cage clamp screw terminals
TONN/ADPT/SER/RS232	9 way D type

TONN ENGINEERING SUITE

Processor	Intel Pentium® IV, 2 GHz or higher	Display	Video card and monitor capable of displaying 1024 x 768 pixel resolution or greater.
Operating System	Microsoft Windows XP Professional, Windows 2003 Server (if Microsoft IIS is disabled), Vista Ultimate, Windows 7 32bit, windows 7 64bit. Mozilla Firefox™ or Internet Explorer™ 5.0 or later.	Network Support	Ethernet adapter (10/100 Mbit with RJ45 connector).
Memory	1 GB minimum, 2GB or more recommended for large systems.		
Hard Drive	1 GB minimum, 5 GB for applications that need more archiving capacity.		

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