

AC30 Series LINKnet



AC30P, AC30D and the AC30V LINKnet firmware
version LN 1.7.4 DRV x.19.4 is compatible with DSE version
3.11 or greater.

Product Manual
HA474739U001
Issue 6.1

Safety Information



Please read this information BEFORE installing the equipment.

Intended Users

This manual is to be made available to all persons who are required to install, configure or service equipment described herein, or any other associated operation.

The information given is intended to highlight safety issues, and to enable the user to obtain maximum benefit from the equipment.

Application Area

The equipment described is intended for industrial motor speed control using DC or AC motor controllers, with DC motors AC induction or AC synchronous machines.

Personnel

Installation, operation and maintenance of the equipment should be carried out by qualified personnel. A qualified person is someone who is technically competent and familiar with all safety information and established safety practices; with the installation process, operation and maintenance of this equipment; and with all the hazards involved.

**REFER TO YOUR MAIN PRODUCT MANUAL FOR SPECIFIC SAFETY
INFORMATION ABOUT THE DEVICE YOU ARE CONTROLLING**

IMPORTANT

It is required that the user be familiar with navigating through the drive MMI menus, be able to select functions and set values and options. For further reading on this topic, refer to the appropriate drive instruction manual. If using DSE or DSE Lite it is recommended that the user must be familiar with the software packages.

© 2021 Parker Hannifin Corporation

All rights strictly reserved. No part of this document may be stored in a retrieval system or transmitted in any form or by any means to persons not employed by Parker Hannifin Corporation, Electromechanical and Drives Division without written permission from Parker Hannifin Corporation, Electromechanical and Drives Division.

Although every effort has been taken to ensure the accuracy of this document it may be necessary, without notice, to make amendments or correct omissions. Parker cannot accept responsibility for damage, injury, or expenses resulting therefrom.

Windows is a registered trademark of Microsoft Corporation in the United States and other countries.

Printed in the USA

Contents

Contents	3
Chapter 1 - Overview	5
Further Reading	6
Product Features	6
Ethernet Protocols Supported:	6
Software Requirements:	6
Hardware Supported:	6
Restrictions	6
Ethernet Recommendations:	7
Web Page:	7
Communication differences:	7
Chapter 2 - Installation	8
Wiring Requirements:	8
Getting Started – Updating the Drive Firmware	9
Updating Codesys firmware to LINKnet firmware using DSE	9
Updating a LINKnet drive to LINKnet using DSE	11
The drive already has LINKnet firmware installed	11
Updating the Drive Firmware using a SD card	13
Getting Started – GKP (Graphical Key pad)	14
Getting Started – Connecting to DSE	14
Chapter 3 - Initial Set-up	16
IP addressing information	16
Setting the Node Address	17
Setting the Computer IP Address for AC30 LINKnet Access via Ethernet	18
Chapter 4 - Using DSE and AC30 Programming	20
Node Addressing the LINKnet Modules	20
Watchdog Circuit	24
Saving of Drive parameters	24
Saving of Favorites in the GKP	25
Parameter color definition	25
Duplicate Node address	26
Duplicate IP address	26
Active Ethernet connection	26
AC30 Additional Function Blocks	27
AC30P/D Phase blocks	28
Chapter 5 – Connecting to the Drive	29
Command / Get Info	30
Chapter 7 – AB EtherNet /IP Server (slave) Example	31
Chapter 8 – Ethernet Network Topology & EDS file	34
EDS file	34
Chapter 9 – Programming TS8000	35
Required Modbus Settings	35
Example: Configuring a TS8000 to Communicate to a AC30V	37

Step 1: Configuring the Modbus Slave Option using DSE.....	37
Chapter 10 - Using Remote I/O	45
Setting up Internal Watchdog on Wago I/O Coupler, 750-352	47
Chapter 11 – Troubleshooting.....	50
Duplicate Node Address	50
Duplicate IP Address	50
Active Ethernet connection	50
Chapter 12 – Technical Specifications & Performance	51
Chapter 13 – Recommended Auxiliary Products	52
Remote IO:	52
Unmanaged Ethernet switches:.....	52
Other Communication Networks:.....	52
Appendix A – AC30 Firmware Release Notes.....	53

Chapter 1 - Overview

This manual is used in conjunction with the AC30 Series Drive Product Manual HA501718U002 which covers the installation, wiring, safety, troubleshooting etc.

This manual covers the LINKnet portion only of the AC30V and AC30P&D drive.

The AC30 drive is a firmware-based drive. The firmware in it can be changed so the programming software available is DSE (Drive System Explorer) or Codesys based. This programming software is the tool used to configure the drive. When either firmware is changed, the configuration and application in the drive will be lost.

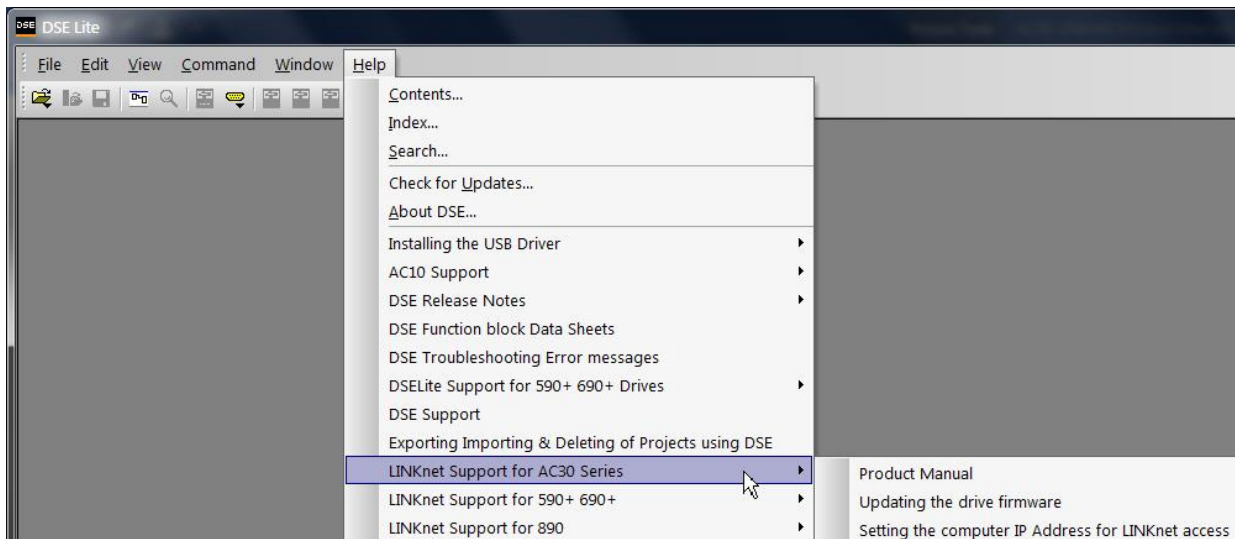
If the firmware in the AC30 drive is compatible with DSE, the drive will be a LINKnet drive. The *LINKnet* option allows standard drives to be a part of the *LINKnet* Ethernet network. A computer may be used to provide supervision and monitoring for each drive and other modules in the system. With this option, the drive can be programmed with DSE or DSE Lite.

If the firmware in the drive is Codesys compatible, the drive can be programmed with PDQ (Parker Drive Quicktool) or PDD (Parker Drive Developer).

The CoDeSys drive firmware can be changed to LINKnet via DSE (version 3.10 or later) or via a SD card.

If the drive is converted from a Codesys platform to a LINKnet platform, it can be converted back to a Codesys platform if desired and vice versa just by putting the desired firmware on SD card and updating the drive. Since the configuration application will be lost when changing the firmware, the appropriate tool DSE or the Codesys tool will be required to install a configuration.

This manual is also located in DSE, in the menu **HELP / LINKnet Support for the AC30**.



Further Reading

AC30 Series Drive Product Manual HA503711U00x.

Product Features

- Supports Phase Locking on the AC30P/D Series drive. (LINKnet firmware version LN 1.7 or greater).
- Supports 690Like Phase Locking on the AC30D Series drive. (LINKnet firmware version LN 1.7 or greater).
- Can be used as a LINKnet communications option between AC30 drives and other LINKnet modules like the 690+, 590+ or 890 drives.
- Supports Modbus UDP/IP Master communications.
- Supports Ethernet IP communications or Modbus/TCP communications option

Ethernet Protocols Supported:

LINKnet supports the following Ethernet protocols:

1. Modbus UDP/IP Master - Supports Remote IO, Input / Output support.
2. Modbus TCP/IP Slave **or** Ethernet IP Server (slave). Supports implicit (Class 1) for data access.

LINKnet acts as a slave device only.

Only 1 Slave protocol can be supported per LINKnet card.

Supports TS8000 HMI Touchscreen and PLCs.

Ethernet IP Server (slave) is supported in LINKnet firmware version 1.6 or greater and DSE v 3.07 or greater.

Supports up to 500 bytes of input data and 500 bytes of output data, using any combination of 16-bit (2 bytes) registers and 32-bit (4 bytes) registers.

Supports up to 250, 16-bit input registers & 250, 16-bit output registers

Supports up to 125, 32-bit input registers & 125, 32-bit output registers

Note: Up to 3 active Modbus TCP/IP connections are supported per LINKnet module, multiple Masters may work but it will require more overhead. (Supported in firmware version 1.6 or greater only)

Software Requirements:

The software DSE (Drive System Explorer) & DSElite version 3.10 or greater supports the AC30 Series LINKnet drive firmware version LN 1.7 or greater. It is always recommended to obtain the latest version of DSE by doing a HELP / CHECK FOR UPDATES.

Hardware Supported:

The AC30 Series drives supported are: AC30V, AC30P & the AC30D including the Feedback and IO options.

Restrictions

“Fieldbus option Communication modules” like Device Net, ControlNet etc., are not supported. Feedback and I/O options are supported.

Registration is not supported, at this time.

Ethernet Recommendations:

The PLC should be set up for Point To Point (Unicast) connection instead of Multicast connection. If Multicast is used, a managed switch is recommended / required.

The LINKnet module should be in a LAN / VLAN with only other equipment associated with its operation. Broadcast traffic on the LAN / VLAN should be kept to a minimum.

Web Page:

The AC30 Series LINKnet drive does not support a webpage.

Communication differences:

When using Ethernet communication to access drive parameters, the protocol for accessing these parameters is different when using the LINKnet platform. When using the Codesys platform, parameters could be accessed directly via Modbus registers. In the LINKnet platform, parameters must be configured using the software tool DSE.

Chapter 2 - Installation

WARNING

Before installing, ensure that the drive power is switched off and cannot be switched on accidentally by other personnel.

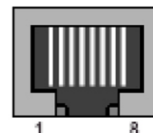
Wait 5 minutes after disconnecting power before working on any part of the system or removing the covers from the drive.

Wiring Requirements:

Use only Cat 6 Shielded Ethernet, patch or crossover cable.

Cable Connections

PIN	Signal
1	TD+
2	TD-
3	RD+
4	Termination
5	Termination
6	RD-
7	Termination
8	Termination



Cable Specifications – patch or crossover

Cable Type	Maximum Node-to-Node Distance (m)
CAT6 Shielded	100

LINKnet operates at the nominal rate of 100 Mbit/s.

Ethernet Connection – (RJ45)

The Ethernet port is primarily intended for peer to peer communications with other modules in the system. Other functions include direct support between the LINKnet module and a PC, ModBus TCP/UDP access to remote I/O, HMI's and PLCs. A computer connected to the Ethernet connector on the LINKnet module or via an Ethernet switch, can be used to install LINKnet configurations or monitor (Go On Line) with any element within the LINKnet network. SSD Drives graphic configuration software package Drive System Explorer 890 (DSE890) version 3.07 and all subsequent versions support LINKnet. If you have an older version, updates may be obtained simply by doing a HELP / CHECK FOR UPDATES within DSE or by contacting Parker SSD Drives Product Support.

Getting Started – Updating the Drive Firmware

In order to use the AC30 drive with the software DSE (Drive System Explorer or DSElite, the firmware in the drive must be changed from CoDeSys based to LINKnet based. There are several ways to change the drive firmware. The first way is to use DSE version 3.10 (or later).

Updating Codesys firmware to LINKnet firmware using DSE

(If the drive already has LINKnet firmware installed, follow the procedure on Page 3 – Updating a LINKnet drive).

Using DSE version 3.10 (or greater) the LINKnet firmware can be installed into the AC30 series drive if the drive has CoDeSys firmware installed.

Beware: The existing Codesys configuration in the drive will be lost when updating the drive to the LINKnet firmware.

Note: If there are problems changing the firmware, try disabling: any antivirus software, firewalls and if there are 2 Ethernet ports Wired or Wireless, temporarily disable the other port on the pc. Also, the Subnet Mask must be 255.255.255.0 on the computer. If an AC30V is having problems, on the Graphical Key Pad go to PARAMETERS | DEVICE MANAGER | DRIVE INFO | BOOT VERSION. It needs to be R2.01 or later for DSE to install the firmware,

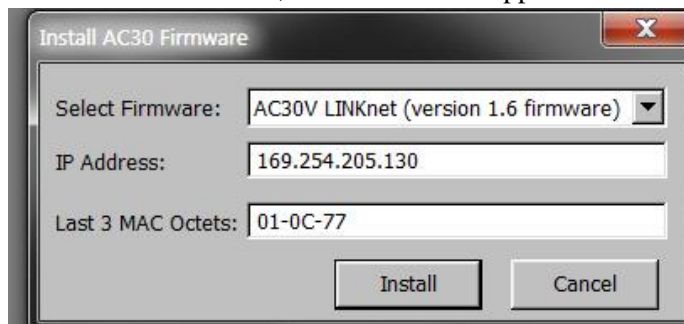
Perform the upgrade:

1. The PC must be set up for an Ethernet connection. See page 11 for “Setting up the computer address for LINKnet”.
2. Connect an Ethernet cable to the AC30 drive. The Ethernet port is located on the top left hand side of the drive for an AC30V drive.

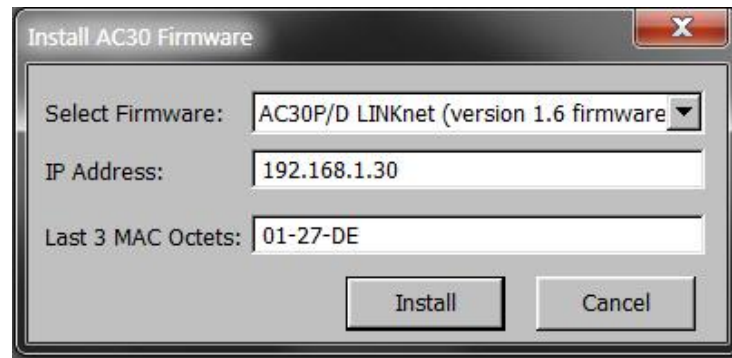
Note: When installing firmware, the Ethernet cable should be connected directly to the drive. Do not connect multiple drives to an Ethernet switch.

3. Connect the cable to the PC which has DSE installed.
4. Launch DSE and go to PROPERTIES | GLOBAL SETTINGS | ACCESS MODULE ON START UP and set this parameter to FALSE. If this was True, close DSE and re launch. (Don't do a COMMAND | REFRESH. Go to step 5)
5. Go to COMMAND | INSTALL AC30 FIRMWARE.
6. A window should appear with the drive data populated in it, as shown. Select the firmware to install.
If the data fields are empty DSE is not communicating to the drive. Verify that the IP Address on the drive and the pc.

For a AC30V drive, the window will appear as



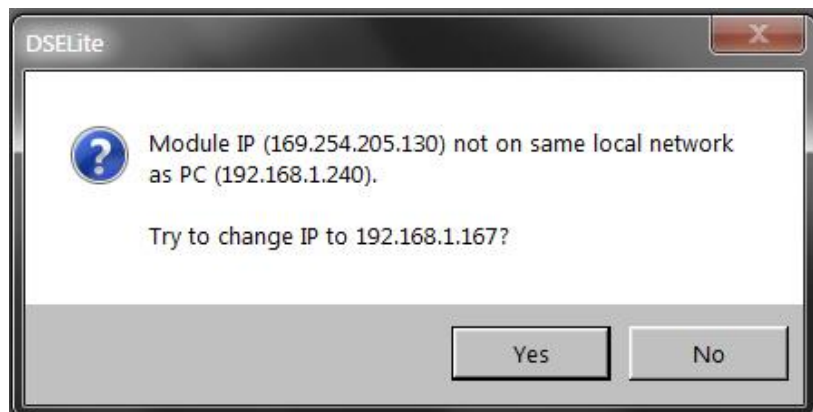
For a AC30P or AC30D drive the window will appear as shown. Select the firmware to install and select INSTALL.



If you are connected via switch, verify that the IP ADDRESS and the MAC are correct for the drive.

7. If a window appears requesting the 'Last 3 Mac Octets' go to the GKP of the drive and go to PARAMETERS | BASE COMMS | ETHERNET and scroll until MAC ADDRESS appears. Get the last 3 Octets. They will be something like 01-27-DE. Enter these values

8. Next the following window may appear. Select YES



9. The red and green buttons on the GKP should be flashing and a message will appear on the screen UPDATING DRIVE FIRMWARE.
10. When the firmware has finished installing the red and green button will stop flashing.
11. There will be an IP Address on the MMI starting with 192.168.1.xx
12. Install a DSE Lite or DSE configuration into the drive.

Updating a LINKnet drive to LINKnet using DSE

The drive already has LINKnet firmware installed


If the drive already has LINKnet firmware installed and you want to upgrade the firmware to a later revision, use this procedure.

Note: If an AC30V drive already has LINKnet firmware v1.6 installed this procedure can't be used. The SD card must be used. If the AC30V firmware has v 1.6.1 or later, this procedure can be used.

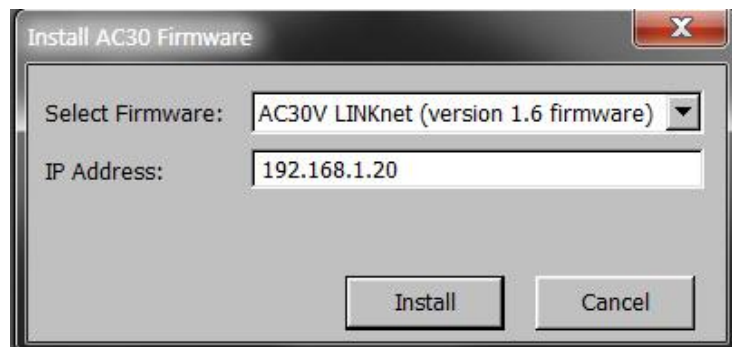
Using DSE version 3.10 (or greater) the LINKnet firmware can be installed into the AC30 LINKnet series drive.

Note: If there are problems Updating the firmware and if there are 2 Ethernet ports Wi-Fi or wired, temporarily disable the other port on the pc. If a AC30V is having problems, on the GKP (Graphical Key Pad) go to PARAMETERS | DEVICE MANAGER | DRIVE INFO | BOOT VERSION. It must be R2.01 or later for DSE to install the firmware.

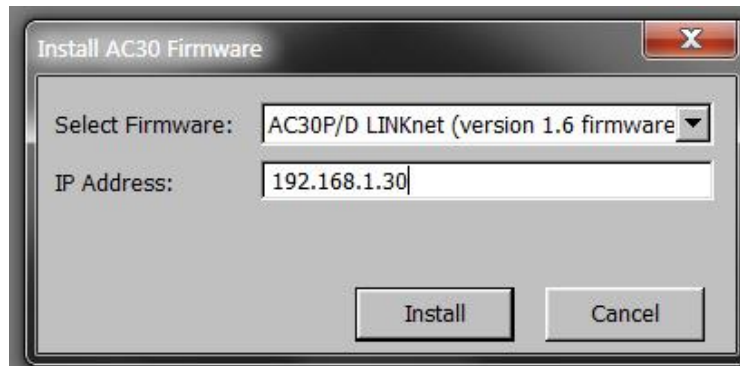
Perform the upgrade:

- A. The PC must be set up for an Ethernet connection. See “Setting up the computer address for LINKnet” located in the DSE HELP menu / LINKnet support for AC30 series.
- B. Connect an Ethernet cable to the AC30 drive. The Ethernet port is located on the top left hand side of the drive for an AC30V drive.
- C. Connect the cable to the PC which has DSE installed.
- D. Click on the yellow icon ‘port’  and select the drive.
- E. The Scratchpad should ‘connected to’...’drive name’.
You may have to do a COMMAND / REFRESH FULL
- F. Go to COMMAND | INSTALL AC30 FIRMWARE.
- G. A window should appear with the drive data populated in it, as shown. The IP address will be shown. Select the firmware to install.

For a AC30V drive, the window will appear as



For an AC30P or D drive, the window will appear as



- H. Click the INSTALL button.
- I. If an error message appears in the Scratchpad [\[ERROR\] connect failed : Connection attempt timed out.](#) and the GKP / MMI on the drive is blank or has the hourglass, **Immediately** click on the INSTALL button again.
- J. The firmware should be installed into the drive.
- K. Install a DSE Lite or DSE configuration into the drive if one is not already installed.

Updating the Drive Firmware using a SD card

Preparing the SD Card.


Copy the AC30 LINKnet firmware to an SD card, make sure the name on the file is named: 'firmware.30x' for a AC30V and the file name for a AC30P/D is 'firmware.30p'

Beware: The existing Codesys configuration in the drive will be lost when updating the drive to the LINKnet firmware.

Perform the upgrade:

Caution: DO NOT REMOVE THE POWER FROM THE DRIVE DURING THE FIRMWARE UPDATE

These steps may vary depending on the preset version of firmware in the drive.

1. Apply power to the drive.
2. Remove the GKP (Graphical Key Pad) from the drive.
3. Insert the SD card in the drives SD slot. The SD slot is located just below the status LED on the right-hand side of the drive.
4. Replace the GKP.
5. Press the top left soft key on the GKP until "3 solid horizontol lines"  appear in the menu just above this soft key.
6. Press this top left soft key. The **View Level** menu will appear. Select **Engineer**. Press the gray OK key.
7. The **Language** menu will appear. Select the desired language.
8. The **Update Firmware** menu should appear.
9. Change the value from False to True and press the grey OK key.
10. The GKP should display **Firmware Update in Progress**.
11. When the firmware has been updated, the top line of the GKP will display **AC30 Link** and an IP address of 192.168.1.xxx will be shown on the bottom line. Verify that the top line states **AC30Link**.
12. Remove the GKP and remove the SD card. Replace the GKP.
13. Use DSE Lite or DSE and install a configuration into the drive.

Getting Started – GKP (Graphical Key pad)

DSE Configuration Name

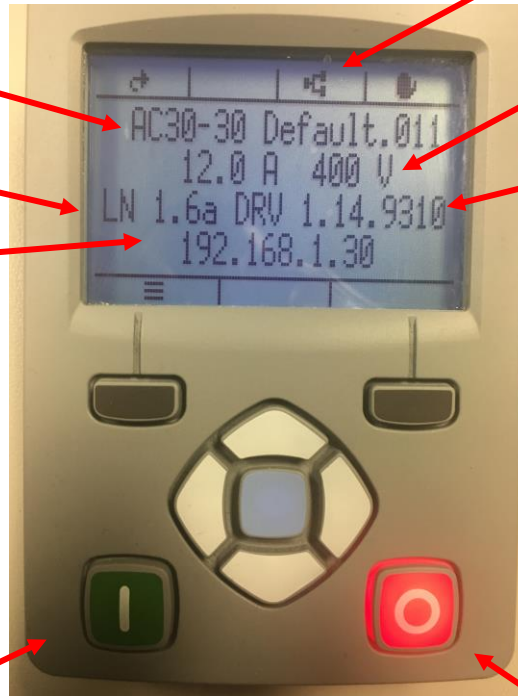
LN 1.6 indicates the
LINKnet Firmware
version

LINKnet IP Address.
Only appears when the
drive has an active
Ethernet connection

Appears when the
drive has an active
Ethernet connection

Drive Current and
Voltage Rating

DRV 1.14 indicates the
AC30 Drive Firmware
version



LINKnet Activity light. The RUN or STOP buttons will flash when connected to other LINKnet Modules. If the drive is Running, the green light will flash. If the drive is stopped, the red light will flash. They will not flash if it is the only LINKnet Module, a standalone module.

Getting Started – Connecting to DSE

1. Connect an Ethernet cable to the AC30V drive. The Ethernet port is located on the top left hand side of the drive. On the AC30P/D the Ethernet ports are located to the right of the control wiring terminal strip.
2. Connect this cable to the PC which has DSE installed.
3. The PC must be set up for Ethernet. See page 11 for “Setting up the computer address for LINKnet”.
4. Launch DSE and click on the yellow Comm Port icon in the top menu bar. The IP address of the connected drive should be in the list. Select this module with the check mark.
5. Do a **Command / Refresh Full**. The drive should appear in the Module list or Scratchpad as “connect to (AC30V v1.6) – No Config”
6. To install a configuration into the drive, do a **File / New** and select either a **AC30V v1.6 template or AC30P/D v1.6** template. Open the **System Control** block and enter in the desired IP address and subnet mask. To install the configuration, do a **Command / Install at Selected** when using DSE or do a **Command / Install** when using DSE Lite. If the IP address is being changed from the default, after the configuration is installed, you need to close DSE and relaunch it. DSE only checks for new IP addresses when it is launched.

Chapter 3 - Initial Set-up

IP addressing information

Each LINKnet module must have a unique IP address. Each LINKnet module has a unique default IP shipping address of 192.168.1.xxx. The last 3 digits will be random for each Module in the range of 1 - 127. When the LINKnet module is powered up in a system and it has the default shipping configuration, it will *self-assign* a unique address on each LINKnet Module as described above, with a subnet Mask of 255.255.254.0

At this point DSE can be launched and all of the LINKnet modules will appear in the **Module List**.

In a LINKnet configuration there is a System Control block which contains a place to set the IP address. If no IP address is entered, the default shipping address of 192.168.1.xxx will be used and the TB will be *self-assigned* an IP address in the range of 192.168.1 and the last octave will be in the range of 127 – 1. Counting down.

If an IP Address is entered in the **System Control** block, it will override the *self-assigned* IP address. (if possible)

If there is a duplicate IP Address, the LINKnet will *self-assign* the modules in the range of 192.168.1 and the last octave will be in the range of 128 to 199.

It is recommended that an IP Address be assigned to each LINKnet module. It is recommended that the LINKnet configuration address be used as the last 3 digits of the IP address. Thus, if the configuration address is 10 the IP address would be 192.168.1.10

When using 3rd party Remote I/O and PLC's, it is recommended to use an IP Address in the range of .200 to .254 All nodes must be on the same subnet mask.

Summary of IP address's for 192.168.1.xxx

where xxx = 1 – 127. *Self-assigned* by LINKnet and assigned by the user.

where xxx = 128 – 199. *Self-assigned* by LINKnet if there are duplicate LINKnet addresses.*See below

where xxx = 200 – 254. Recommended IP Address' when using 3rd party Remote I/O and PLC's,

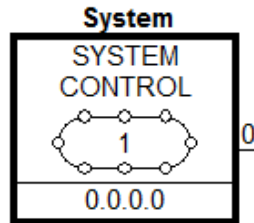
*Note: 3rd party IP addresses are not checked. Only LINKnet modules are checked.

Setting the Node Address

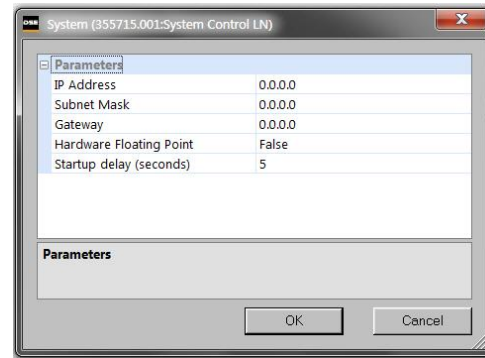
Up to 127 LINKnet nodes can be addressed in the LINKnet configuration. Thus, the **Node Address** range is 1 – 127.

To set the **Node Address** use DSE and go to **EDIT / Net Address** and set the **Node Address**. The **Node Address** in the example shown below is address 10.

There is no limitation on the IP address, but they all **MUST** be on the same subnet.



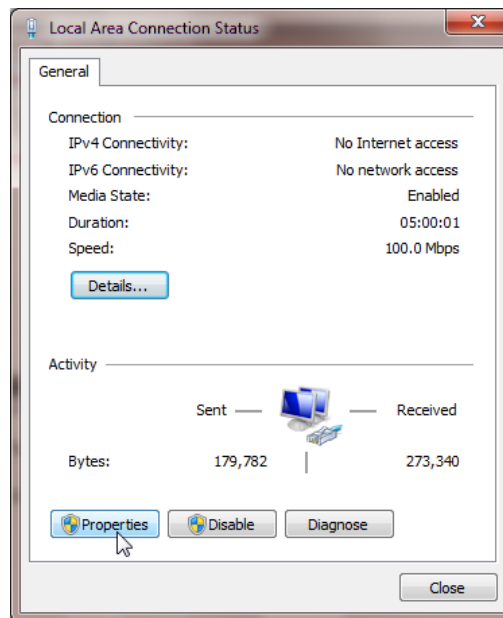
The SYSTEM CONTROL block is located in the LINKnet configuration.



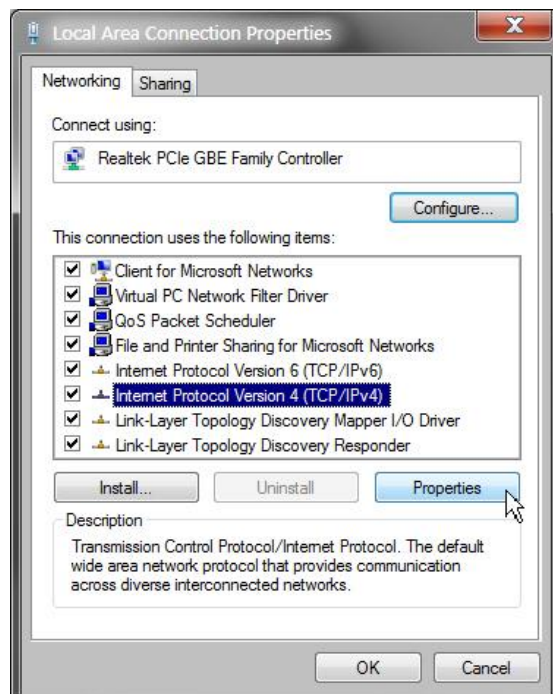
Setting the Computer IP Address for AC30 LINKnet Access via Ethernet

When communicating to the LINKnet via Ethernet, the computer must be on the same subnet. To change the pc settings:

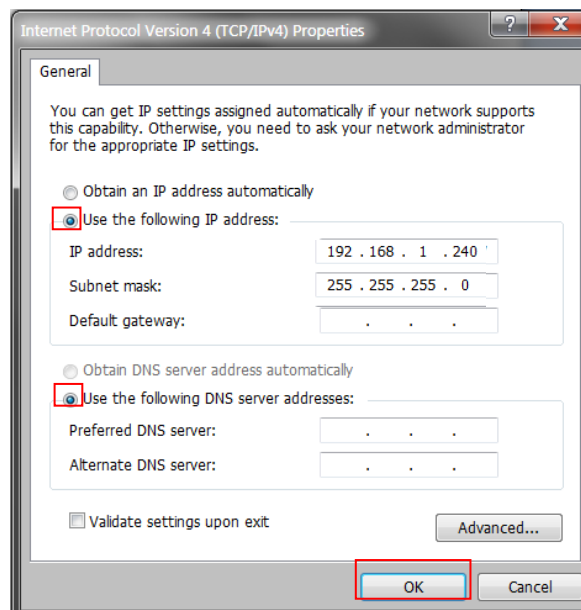
1. From the START menu, open the Control Panel and select “Network and Sharing Center” or “Network Connections” depending on the version of Windows you’re running.
2. In the window that comes up, click on “**Local Area Connection**”. That should bring up a dialog that looks something like the following:



3. Click on the **Properties** button to bring up the Local Area Connection Properties dialog. On Windows 7 it should look something like this (it will be slightly different for XP):



4. As shown above the **Local Area Connection Properties** dialog will appear. Highlight the “**Internet Protocol Version 4 (TCP/IPv4)**” (“Internet Protocol TCP/IP” in XP), then click on the **Properties** box and that should bring up the Internet Protocol Dialog that should look something like:



5. Click on the selection “**Use the following IP address**” and enter 192.168.1.240 for the IP address and 255.255.255.0 for the Subnet mask. Make sure “**Use the following DNS server addresses**” is also selected, but you don’t have to enter anything for that. Click **OK**. (For the IP address the last octet should be any number over 200).

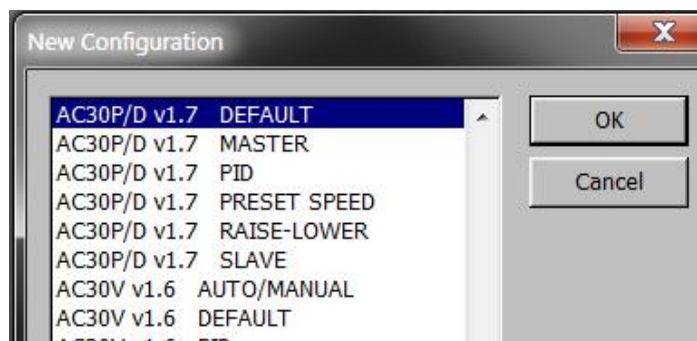
Chapter 4 - Using DSE and AC30 Programming

Node Addressing the LINKnet Modules

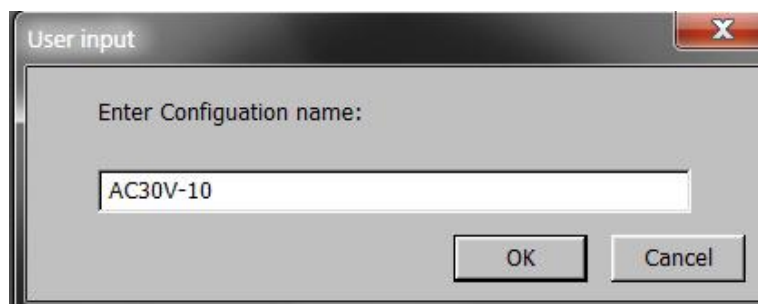
Each LINKnet module must have a unique Node Address assigned to it.
The range allowed in DSE is 1 to 127.

AC30 Macro Template

The AC30 macro is selected from the **File/New** drop-down menu as shown below. This **AC30V or AC30P/D v1.7** supports an AC30 drive with firmware version 1.7.x



Select the applicable configuration template for your drive. The program will prompt you for a **Configuration name**.



Modifying Inside the Macro

All the drive functions are available through the macro

Deleting and/or Moving an Internal Connection

The connections inside the macro can be deleted or moved in the same fashion that is used in DSE. If the connection is only being moved from one block to another block it is not necessary to delete the external macro connection.

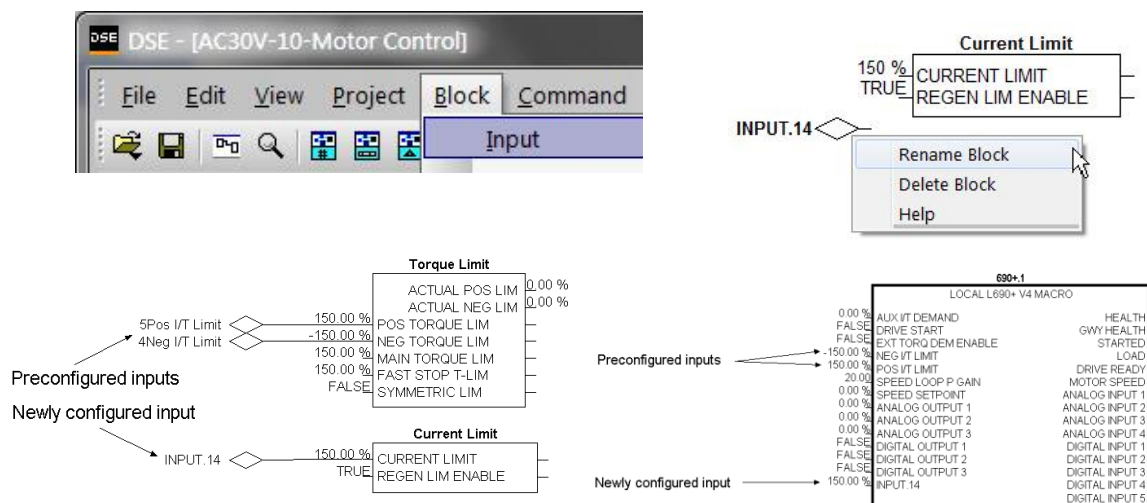
Inserting Function Blocks

LINKnet function blocks may be programmed into the AC30V template. *LINK* function blocks can be inserted outside or inside the macro. The function blocks are accessed in the same manner as other *Link2* modules.

Inserting and Deleting Macro Inputs/Outputs

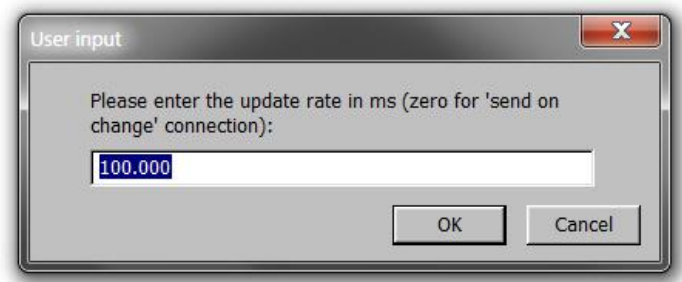
Connections in and out of the macros are made by the following methods.

1. Selecting the inputs and outputs from the BLOCK menu will allow the I/O diamonds to be inserted into the macro. The diamond shaped Input and Output tags can be dropped anywhere inside the drive macro. Drawing a link from the Input/Output diamond to the desired connection point will make the connection to outside the macro.
2. Highlighting the tag and pressing the “DELETE” key will delete inputs or outputs. Prior to deleting the tag, be sure to disconnect all external connections to the macro.



Note: Internal tags do not get a module address or slot address. The tag appears as a connection point on the outside of the macro. Right mouse clicking on the diamond will allow you to change the name of the tag. This name will appear inside and outside the macro. The number preceding the tag name controls the order of appearance on the macro outside connection points. The number may be changed in the same manner as changing the name of the tag.

Certain output tags will require an entry for the connection speed. The faster connection speeds require more of the CPU heap usage. If too many fast connections are made, it may be possible to run out of CPU heap and cause an “L-Error” fault. Keep fast connections to a minimum.



FEEDBACKS		
DC LINK VOLTAGE	0 V	
ACTUAL SPEED RPM	0 RPM	
ACTUAL SPEED RPS	0 rev/s	
ACTUAL SPEED PERCENT	0 %	
DC LINK VOLT FILTERED	0 V	
ID	0 %	
IQ	0 %	
ACTUAL TORQUE	0 %	50 ms ◇ MOTOR CURRENT
ACTUAL FIELD CURRENT	0 %	
MOTOR CURRENT (%)	0 %	
MOTOR CURRENT AMPS	0 A	
100% STACK CURRENT A	0 A	
STACK CURRENT (%)	0 %	
MOTOR TERMINAL VOLTS	0 V	
CM TEMPERATURE	0 °C	
HEATSINK TEMPERATURE	0 °C	
ELEC ROTOR SPEED	0 Hz	
NORMAL DUTY		
DUTY SELECTION		

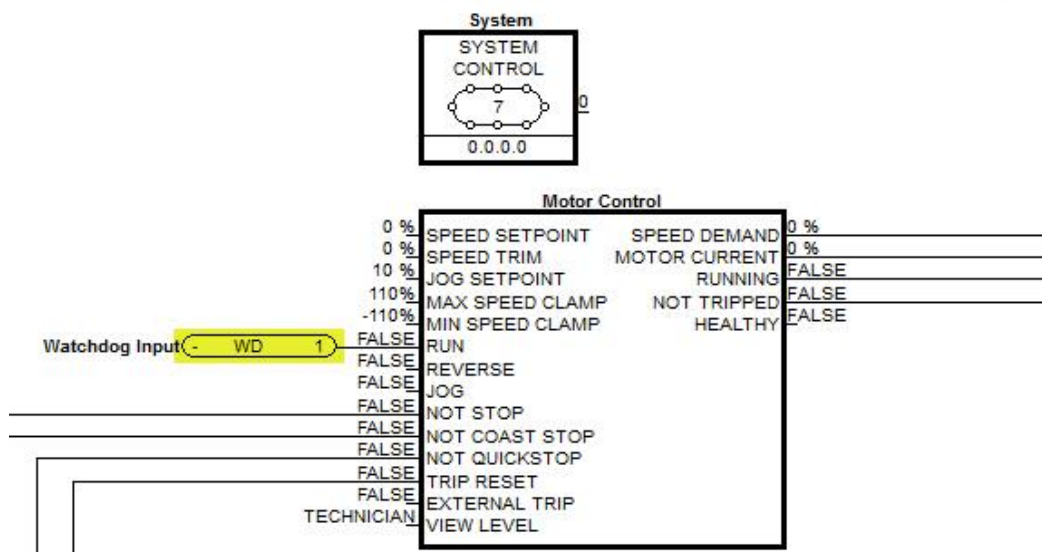
3. A **Digital Input** or **Output** will not require a connection speed as they are updated on a change of state only. Meaning that if the state is always True, an Output will not be sent until the state changes to a False. The **Digital Outputs** are scanned at a rate of 100 ms.

SEQUENCING LOGIC		
0 s	START DELAY	TRIPPED FALSE
FALSE	RUN	RUNNING FALSE
FALSE	REVERSE	JOGGING FALSE
FALSE	NOT STOP	STOPPING FALSE
FALSE	JOG	OUTPUT CONTACTOR FALSE
TRUE	DRIVE ENABLE	SWITCH ON ENABLE FALSE
FALSE	NOT FAST STOP	SWITCHED ON FALSE
FALSE	NOT COAST STOP	READY FALSE
FALSE	REM TRIP RESET	SYSTEM RESET FALSE
TRUE	TRIP RST BY RUN	SEQUENCER STATE NOT READY
FALSE	POWER UP START	HEALTHY FALSE
FALSE	EXTERNAL TRIP	FAN RUNNING FALSE
		VOLTAGE ENABLED FALSE
		STATUS WORD 0x0000
		STO INACTIVE FALSE
		RUN KEY FALSE
		STOP KEY FALSE

Watchdog Circuit

It is recommended that a Watchdog Circuit be implemented in each LINKnet configuration to stop the drive if there is a loss of Ethernet communications. Presently if there is a loss of Ethernet communications on the LINKnet drive, it will continue to run and not fault. Within DSE there is a WATCHDOG INPUT function block located in the BLOCK MENU. It can be connected to the DRIVE START Input in place of an INPUT Slot. It must be updated with a logic True signal. If 5 seconds has passed and it is not updated with a logic True, the Output of the block will go False and the drive will stop and not fault. This WATCHDOG can also be connected to a Digital Output which can be monitored by the user to take further action. For more information on this function block, see the Help Data sheet within DSE.

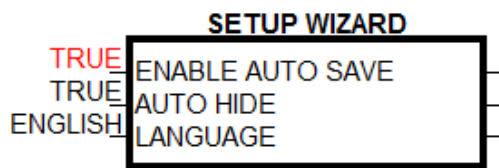
LINKnet AC30 Basic Speed Control Template



Saving of Drive parameters

If a parameter is changed via the GKP (Graphical Keypad) or when ON LINE when using DSE, to save the parameters, the parameters must be saved. This can be done while using DSE and go to **Command / Parameter Save** or via the GKP by going to **Setup / Environment / Save ALL Parameters** and setting this value to True or **Parameters / Device Manager / Device Commands / Save ALL Parameters** and setting this value to True.

If you want the parameters to be saved automatically any time a parameter is changed via the GKP or when ON LINE with DSE, set the **Enable Auto Save** to True in the **Setup Wizard** function block. To set it from the GKP go to **Parameters / Device Manager / Setup Wizard**. Set Enable Auto Save to True. Now anytime a parameter is changed it will be saved automatically every 100ms.




Saving of Favorites in the GKP

In the GKP (Graphical Key Pad) there is a menu called Favorites. It is where 20 selected parameters can be added for quick access.

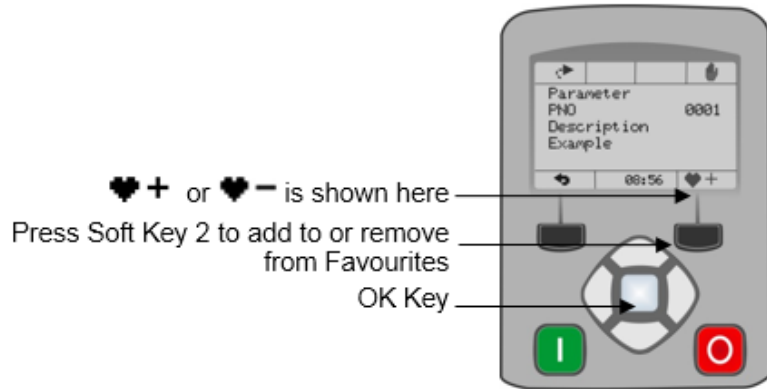
To Add a Parameter to the Favorites Menu

Using the GKP, navigate to the parameter of interest.

Press and hold the OK key until the Attributes screen is shown, (hold for about 2s)

then this appears  and press the “Add to Favorites” soft key

To save the Favorites to the GKP go to **Quick Setup / Update Favorites** and set the parameter to True.



Parameter color definition

In the template, some parameters have different colors associated with them.

The black colored parameters get installed when a **Command / Install** is performed.

The **magenta** colored parameters are frame dependent parameters and they only get installed when a **Command / Full Install at Selected** is performed. In order to do a **Full Install**, the template must be **Updated** first, by doing a **Project / Update**.


The **blue** colored parameters indicated that they can't be changed while the drive is Running.

FLUXING VHZ	
	VSD DEMAND 0 %
	VSQ DEMAND 0 %
LINEAR	VHZ SHAPE
0 %	FIXED BOOST
0 %	AUTO BOOST
0 %	ACCELERATION BOOST
FALSE	FNFRGY SAVING FNARI F

Duplicate Node address

If there is a duplicate **Node Address**, meaning that 2 or more nodes have the same **Node address**, the GKP green **Run** button will flash and the GKP screen backlight will flash off / on, on the modules that have the duplicate addresses. To change the **Node address** use DSE and go to **EDIT / Node Address** and change the **Node Address** so there are not duplicate **Node Addresses** on the Ethernet network.


Duplicate IP address

If there is a duplicate LINKnet **IP address**, meaning that 2 or more LINKnet modules have the same **IP address**, the GKP (Graphical Key pad) Ethernet icon  on the top row of the GKP menu will flash off /on, on the module which has the duplicate **IP address**. Also, the GKP backlight will flash off /on. This modules **IP address** will be re assigned a temporary address, as its IP address is being used in a different module. If you go to the menu **Parameters / Base Comm / Ethernet State**, the **Ethernet State** will indicate **Duplicate Address**.

Once the configuration is installed with the correct IP address, power may have to be cycled on the modules, to resolve the conflict of the IP addresses.

Only LINKnet modules are checked for duplicate addresses. Don't check for PLC's and other hardware.

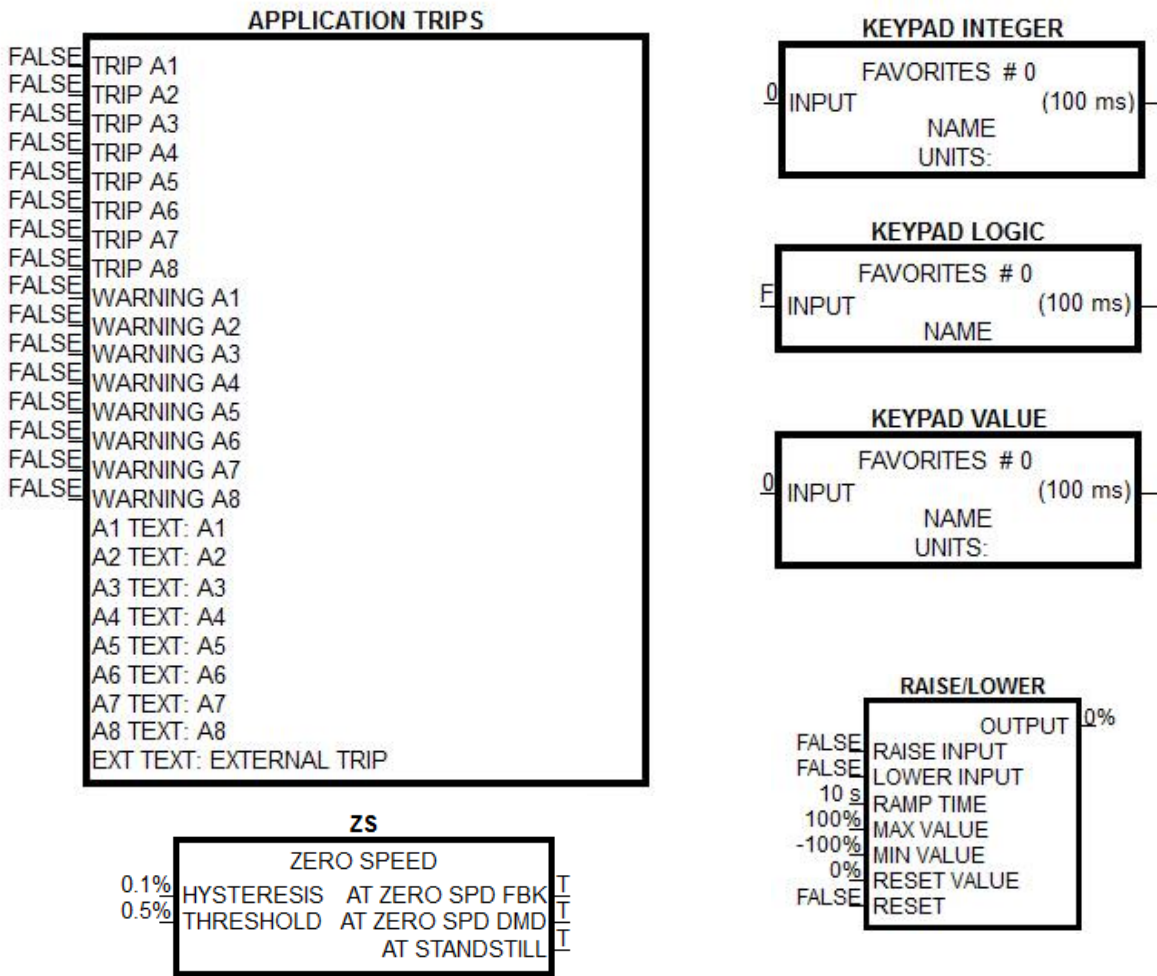
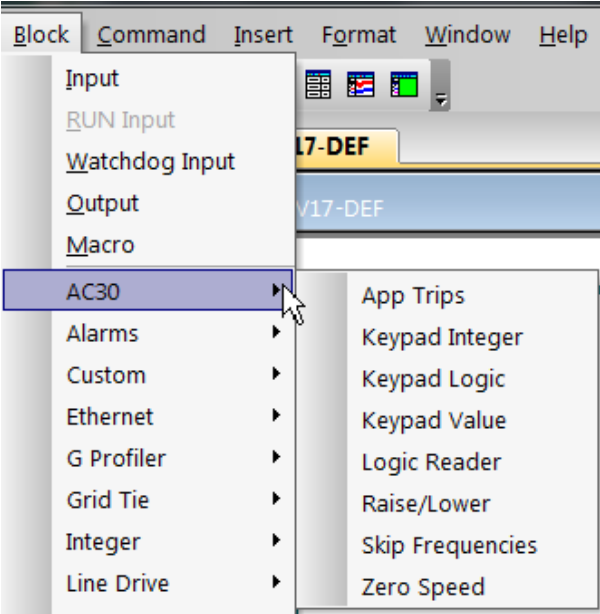
Active Ethernet connection

If there is an active Ethernet connection the Ethernet icon  on the top row of the GKP will appear and the IP address of the module will on the bottom row of the GKP.

AC30 Additional Function Blocks

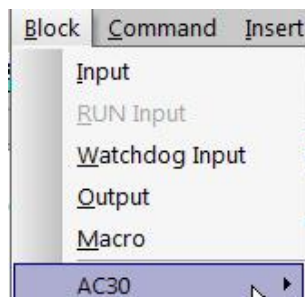
There are additional function blocks which can be used on the AC30P/D and AC30V Series drive. In the DSE menu **Block / AC30** these are additional function blocks which can be used:

- **App Trips.** Is used to create a custom **Trip** for the drive, associated with a custom trip message which will be displayed on the GKP (Graphical Key pad). Also, a custom **Warning** can be associated with a custom Warning message, which can be displayed in the GKP. A warning does not trip / fault the drive.
- **Keypad Integer, Keypad Logic and Keypad Value.** These function blocks are used to configure the **Keypad** menu to access parameters in the configuration which are not already in the menu or Virtual Machine parameters which do not have a tag number.
- **Raise Lower.** The Raise/Lower function acts as an internal motorized potentiometer (MOP) used as a reference source.
- **Zero Speed.** This function block detects when the motor speed is at or close to zero speed.



AC30P/D Phase blocks

There are additional function blocks which can be used on the AC30P/D Series drive for **Phase Control**. These drives are considered **Advanced Performance**, thus additional blocks can be used and the blocks are green in color. In the DSE menu **Block / AC30** the additional **Phase** function blocks are:



App Trips
CAM Table
Keypad Integer
Keypad Logic
Keypad Value
Logic Reader
Phase Cam
Phase Inch
Phase Move
Phase Tuning
Position Loop
Raise/Lower
Skip Frequencies
Virtual Master
Virtual Slave
Zero Speed

VIRTUAL MASTER

0%	INPUT	POSITION	0
10	ACCEL RATE	SPEED	0 rev/s
10	DECEL RATE	ACCEL	0 rev/s ²
10	JERK 1	RAMPING	F
10	JERK 2	STATUS	READY
10	JERK 3		
10	JERK 4		
F	CONTINUOUS		
F	HOLD		
F	SYMMETRIC JERK		
F	RESET		
0	OFFSET		
OPTION	SOURCE		
LINEAR	RAMP TYPE		
0	CHANNEL		
REVS	POSITION UNITS		
	UPDATE RATE: 50 ms		

PHASE MOVE

F	ENABLE	STATE	DONE
0	DISTANCE	DISTANCE LEFT	0
0	DISTANCE FINE	SPEED	0
1	VELOCITY		
1	ACCELERATION		
F	RESET		

VIRTUAL SLAVE

NONE	MASTER SOURCE	REF POS	0
MOTOR FBK	SLAVE SOURCE	REF SPEED	0 rev/s
5 ms	SPEED FILTER	REF ACCEL	0 rev/s ²
5 ms	ACCEL FILTER	POSITION	0
1	GEAR RATIO A	SPEED	0 rev/s
1	GEAR RATIO B	ACCEL	0 rev/s ²
0	OFFSET	ACTIVE	F
T	ALL DRIVES LOCKED		
0	CHANNEL		
REVS	POSITION UNITS		
	UPDATE RATE: 50 ms		

POSITION LOOP

10	PROP GAIN	POSITION ERROR	0
500	INTEGRAL TC	SPD FEED FORWARD	0 rev/s
F	INTEGRAL DEFEAT	PI OUTPUT	0 rev/s
10	ENABLE	SPD FF + PI	F
T	LIMIT CLAMP	LIMITING	0
0	RESET	FOLLOWING ERROR	0
0	OFFSET	TOTAL OFFSET	0
1 rev/s	MOVE TO MASTER	DEMAND POSITION	0
1 rev/s ²	MM VELOCITY	FEEDBACK POSITION	0
ANY	MM ACCEL	FEEDBACK REVS	0
0.003	MOVE METHOD	OPERATING MODE	NORMAL SPD
F	MOVE WINDOW	DIST TO MASTER	0
	5720 EMULATION	MM ACTIVE	F
	UPDATE RATE: 50 ms		

CAM

F	CAM TABLE 1	F	OK
	CREATE	DONE	
		STATUS	
		ANALOG	
		DIGITAL 0	
		DIGITAL 1	

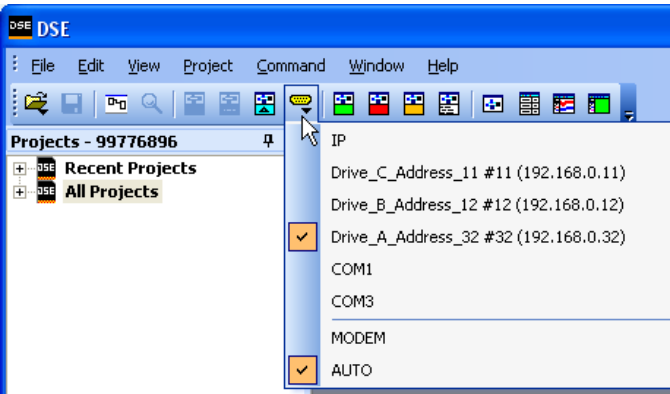
PHASE CAM

F	ENABLE	STATE	DISABLED
F	LOAD CAM	CAM ID	0
F	TRIGGER	TRIM LEFT	0 rev
0 rev	OUTPUT TRIM	POSITION	0 rev
0 rev	START DELAY		
1	OUTPUT SCALE		
0 rev	END DELAY		
1	ACCEL SCALE		

Chapter 5 – Connecting to the Drive

To connect to the drive an Ethernet cable is required

To use the Ethernet connection the PC must be set up to be on the same subnet address as LINKnet. This setup procedure is listed on page 8 of this manual. Once this setup is complete connect the PC's Ethernet cable to a device which is on the LINKnet communications network such as a switch. Then launch DSE. Go to the yellow Serial port Icon and select it. All of the modules which are on the LINKnet will be shown along with the IP Address of each module. Also, shown will be which module the Ethernet is connected to.



In the example shown the Ethernet is connected to ‘Drive_A_Address_32’. There are 3 modules on this Ethernet. The ‘checked box’ shows which module DSE is connected via the Ethernet.

The *Module List* will look like the picture shown. The * indicates which module, DSE is connected to.

Module list							
Adrs	Name	Library	Status	CPU %	RAM %	Msg/s In	Errs
*0032	Drive_A_Address_32	LNTB v1.1	OK	5.1	12.2	989	0
0012	Drive_B_Address_12	LNTB v1.1	OK	0.0	2.7	1021	0

CPU % (Peak) indicates the amount of CPU activity, or how busy the microprocessor was since the last update of the module list.

RAM % (Peak) indicates how much RAM(SRAM) the modules CPU has used since the module list last entered the OK state & began executing the installed configuration.

Msg/s In (Messages In/second) Average number of Input Messages per second of network traffic for that module.

Errs indicates the amount of Communication Errors since the Module List was refreshed.

Command / Get Info

A *Command / Get Info* shows the modules *IP Address* as shown below. It also shows the *firmware* build (shown 1.6), the remote boot *loader* firmware (shown B1.1) information and the *Events/s*. This is the number of vm (virtual machine) functions blocks, executing per second. A *node* is a measurement of storage units for vm blocks.

```

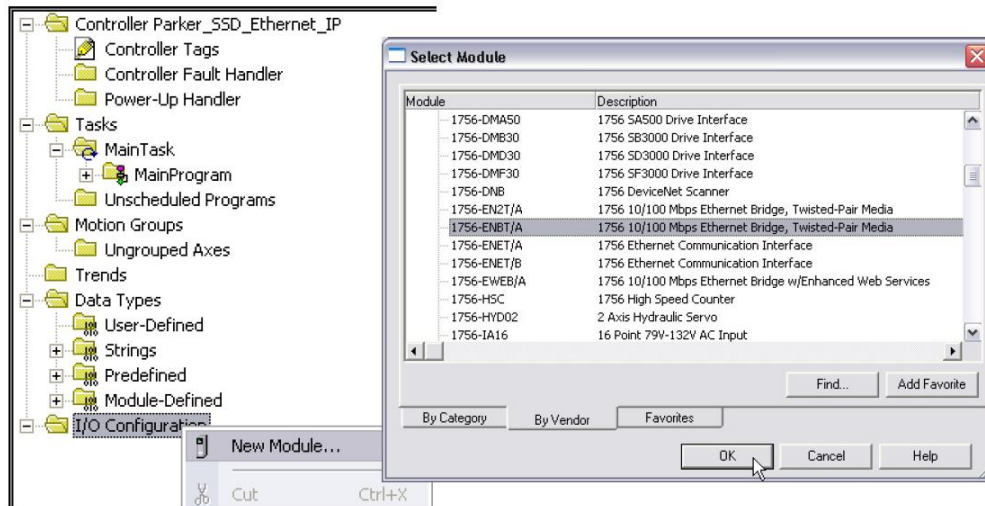
Scratch Pad
-----Module Information-----
Serial number:      8902-UF-8-3788, MAC: 00:0D:46:01:0E:CB, IP: 192.168.1.30
Hardware:           AC30 Module (ROM 10.0)
Library:            AC30V LINKnet (version 1.6 firmware) - build 1.6 (RD470908.006)
Project:            99776899:AC30V Demo /AC30V
Configuration:      AC30V-10
Modification:       2
Permanent address:  30
Working address:    30
Persistents used:   22.9% (110 of 480)
Storage used:       11.2% (115 of 1024 pages)
CPU used (Recent/Peak): 0.0%/1.2%
RAM used (Static/Peak): 18.8%/18.8% (1913/1927 of 10237 nodes)
Input Messages/s:  12
Status:             OK, drive not started

```

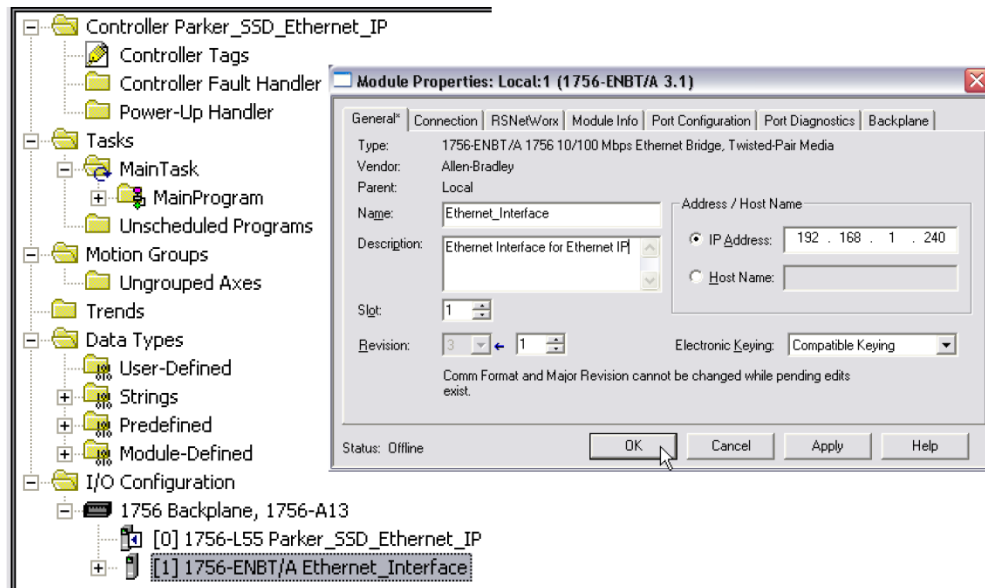
Chapter 7 – AB EtherNet /IP Server (slave) Example

Allen Bradley ControlLogix

1. Start a new program and select the PLC processor and chassis type that is used in your project. Our example uses a 1756-L55A processor and 1756-A7/B rack. Remain Offline until you are ready to download the program.
2. Using the I/O Configuration insert the Ethernet interface that will be installed. Right click on the I/O Configuration, select New Module. Our example uses 1756-ENBT/A. Input the desired IP address and slot in the PLC.

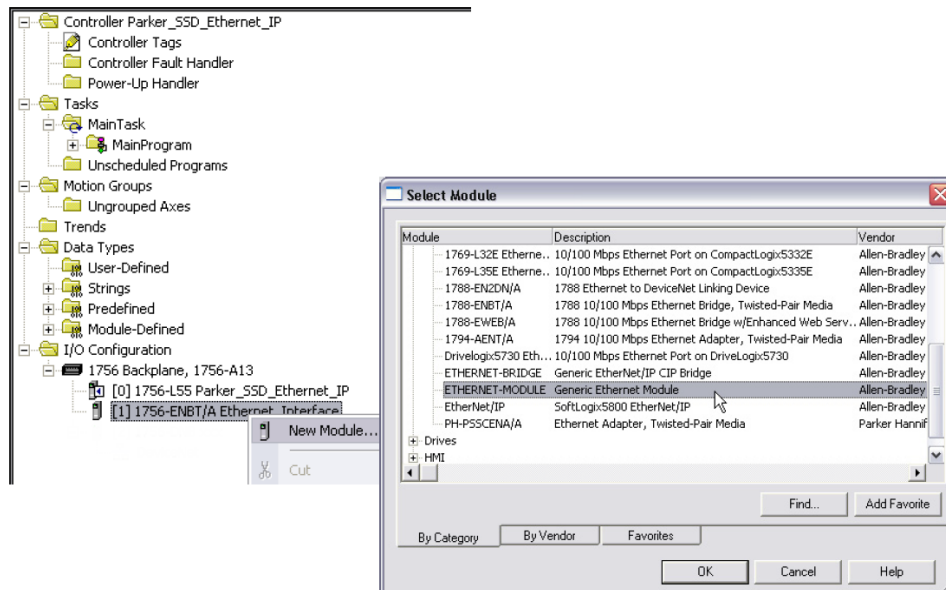


Ethernet Interface Selection



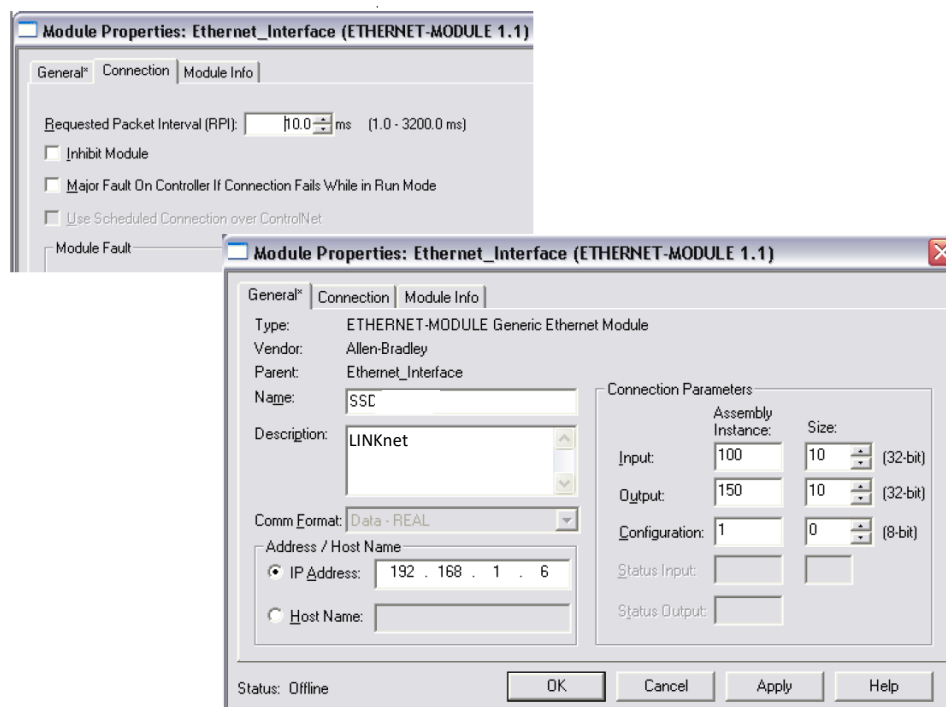
Ethernet Interface Setup

- Right click on the Ethernet Interface Module, select New Module. This screen will allow the selection of the Generic Ethernet Module.



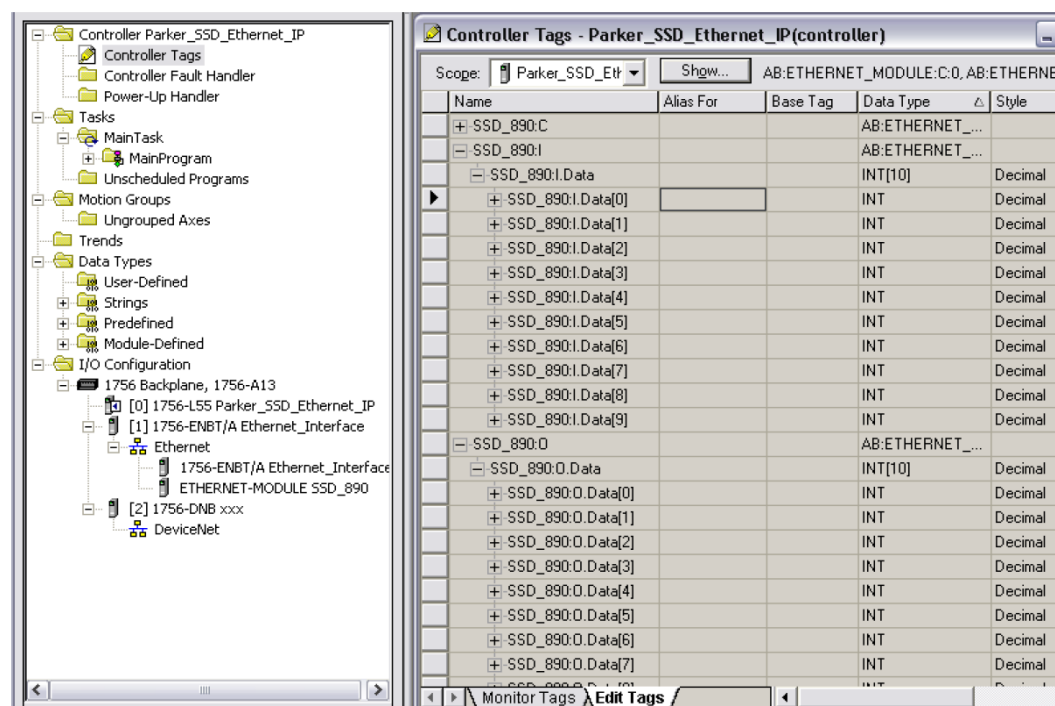
Generic Ethernet Module Select

- Input the desired module name and IP address. The Comms format will be DATA Int if 16-bit signed integer, or Data-REAL if 32-bit floating point. The Input Assembly Instance is 100 and the Output Assembly Instance is 150.
- Click on Next to change the Requested Packet Interval (RPI). The default value of 10ms should be sufficient. If the RPI is set below 5ms unreliable communications may be experienced.



Generic Ethernet Module Setup

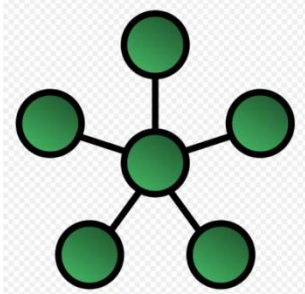
6. When completed with the setup of the Generic Ethernet Module it can be downloaded to the PLC. For testing purposes it is not necessary to program Ladder Logic in the PLC. The data can be accessed and monitored via Controller Tags.



Controller Tags

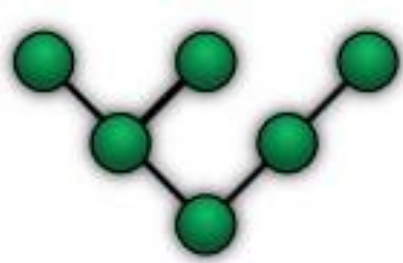
Chapter 8 – Ethernet Network Topology & EDS file

When configuring the Ethernet topology – i.e. connecting the LINKnet Module's together in a system with Ethernet switches, it is recommended to use a *Star* configuration. A *Tree* configuration will work.



Star Configuration

Recommended



Tree Configuration

If possible, do not use a *Daisy Chain* topology as this type adds propagation delays each time data passes from module to module.



Daisy Chain Configuration

Not Recommended

EDS file

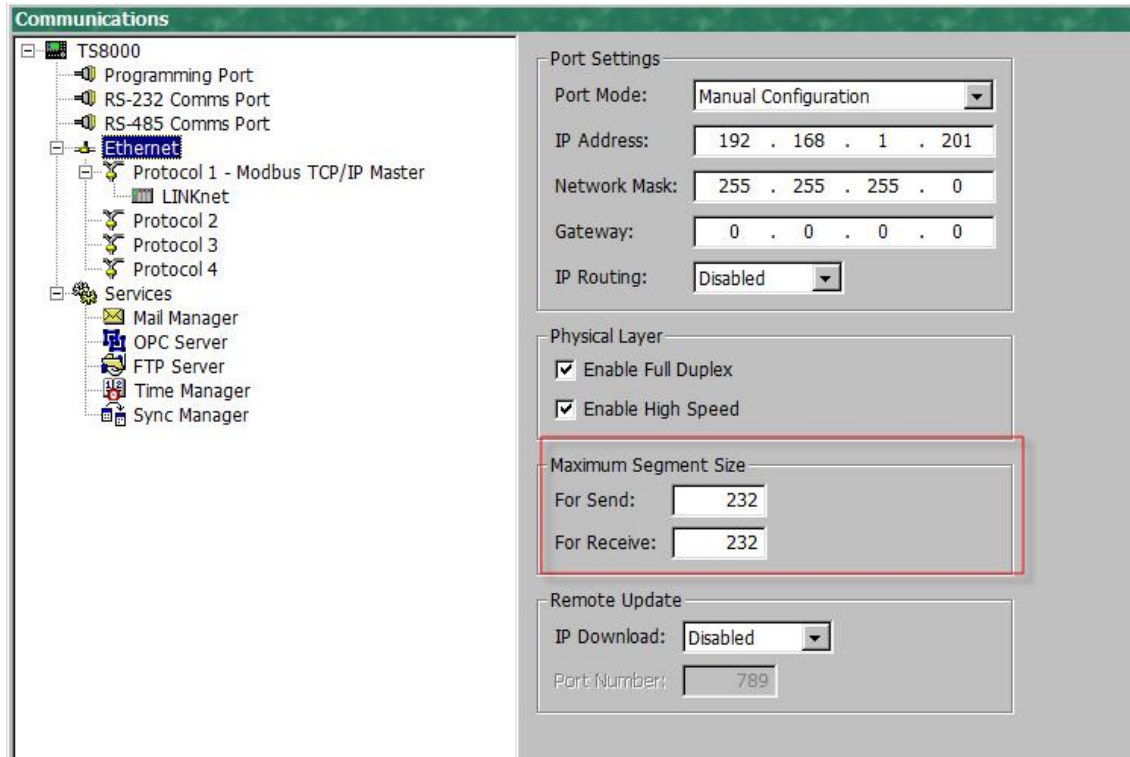
If required an Electronic Data Sheet (.eds) is available. It can be downloaded from www.parker.com/ssdusa/software under the **Various AC/DC Drives Communication Files** menu.

Chapter 9 – Programming TS8000

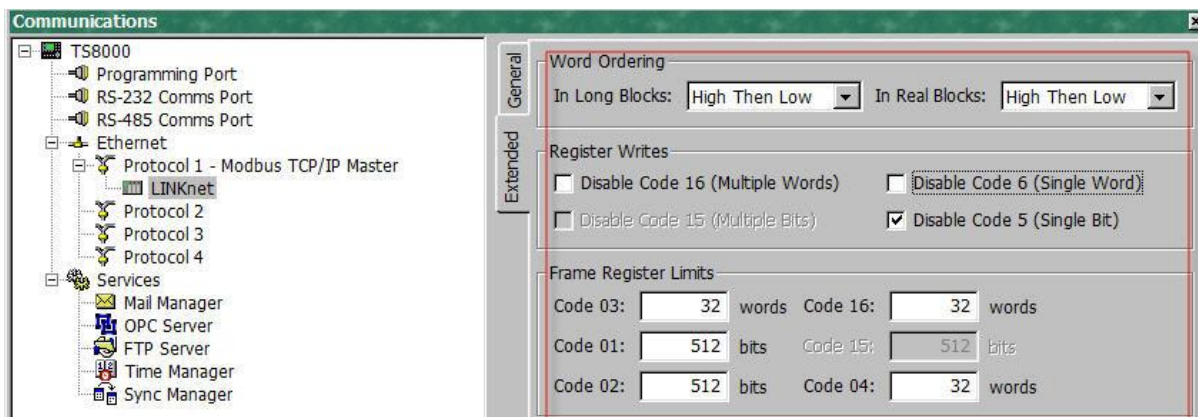
Required Modbus Settings

There are some settings / limits that are required for the TS8000 communications.

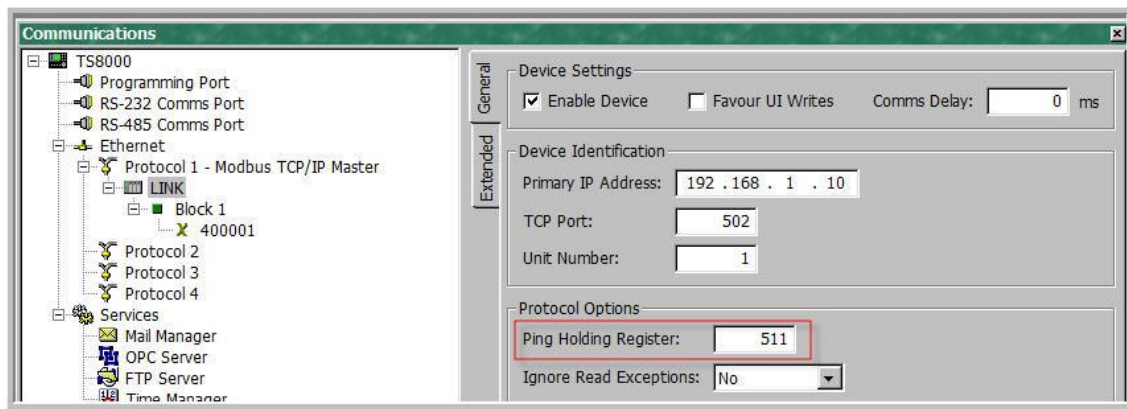
The *Maximum Segment* (Ethernet packet) size is 232:



In the *Extended Settings*, the Word Ordering, Register Writes and the Frame Register Limits need to be set as shown below:



For each LINKnet module the *General / Ping Holding Register* must be set to 511. If set to 0, this disables it. Either setting is acceptable.



NOTES:

1. When powering up the TS8000, the outgoing data is only sent once to the remote devices. If the TS8000 powers up first or before the other devices, the TS8000 will send this outgoing data before the other devices have time to power up and they will not receive any of this data. To solve this issue the TS8000 must power up last or set up the command word to resend the data to the TS8000.
2. The TS8000 only sends the same data value, 1 time. Thus, if a value of 10 is sent, it will not re send this value of 10 again even if it is requested to. The value must be changed to a different value like 11, then the value of 10 can be sent.
3. It is recommended that the TS8000 sends 32 bit values to the LINKnet Module, instead of 16 Bit values, as both devices are 32 bit. Set it up for "Word is Long".
4. Within the LINKnet Module, it is recommended not to access the Remote I/O data, faster than 5 ms.

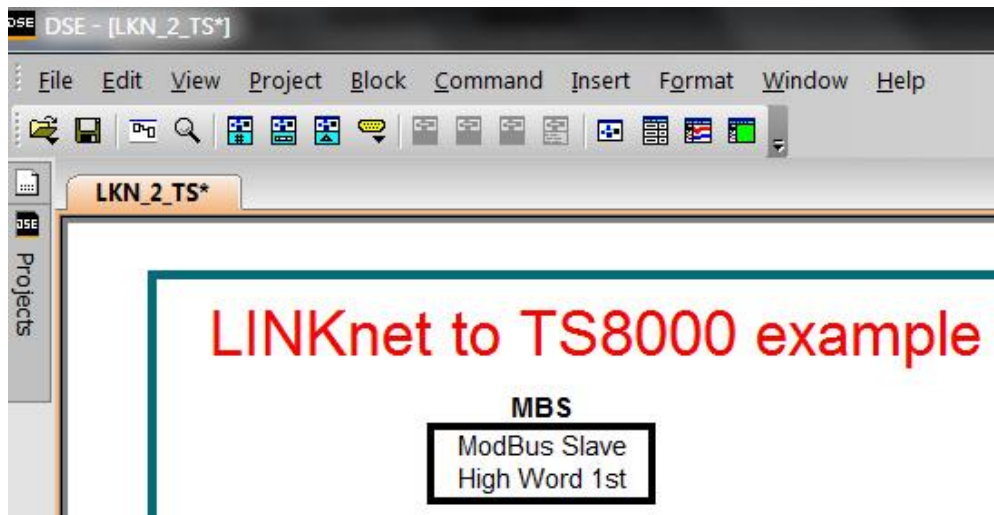
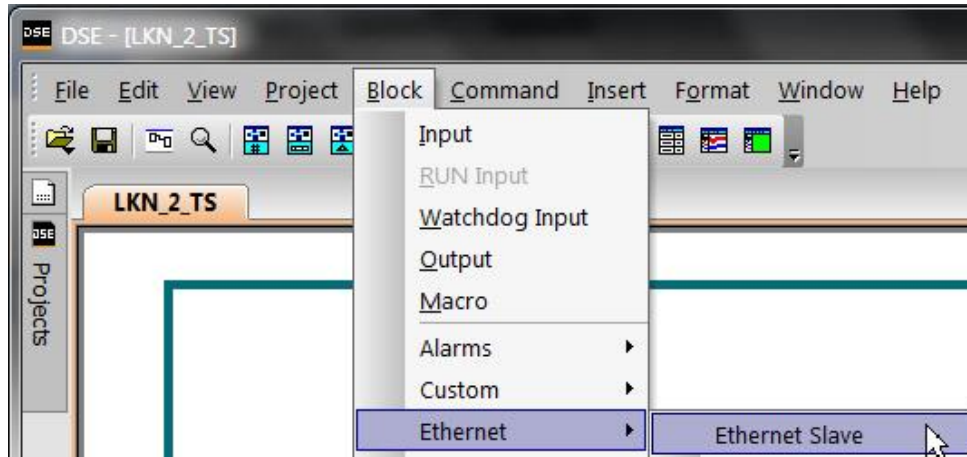
Example: Configuring a TS8000 to Communicate to a AC30V

Step 1: Configuring the Modbus Slave Option using DSE

Step 1.1: Inserting a Modbus Slave Function Block

Display your configuration page. Click on the “Block” menu at the top of the screen.

1. Move the cursor down to select "Ethernet" and select "Ethernet Slave".
2. Click to attach the block icon to the cursor. Move the icon to where you want on the screen. Click again to release the icon.



Step 1.2: Attaching Fieldbus Connectors

Seven fieldbus connector types are available:

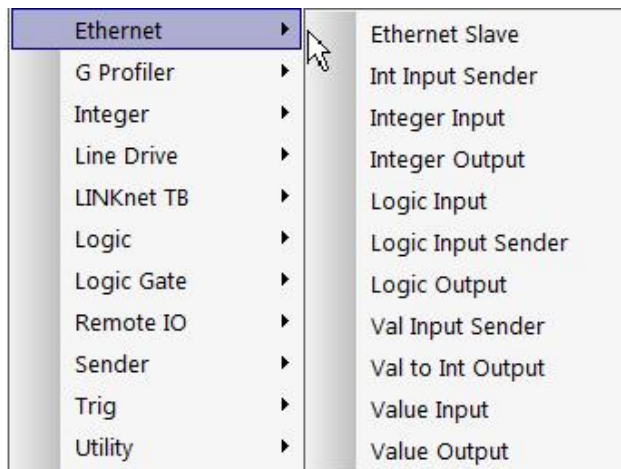
Logic Input	Integer Input	Value Input	
Logic Output	Integer Output	Value Output	FB Val to Int Output

Input connector: the data is sent from the TS8000 to LINKnet

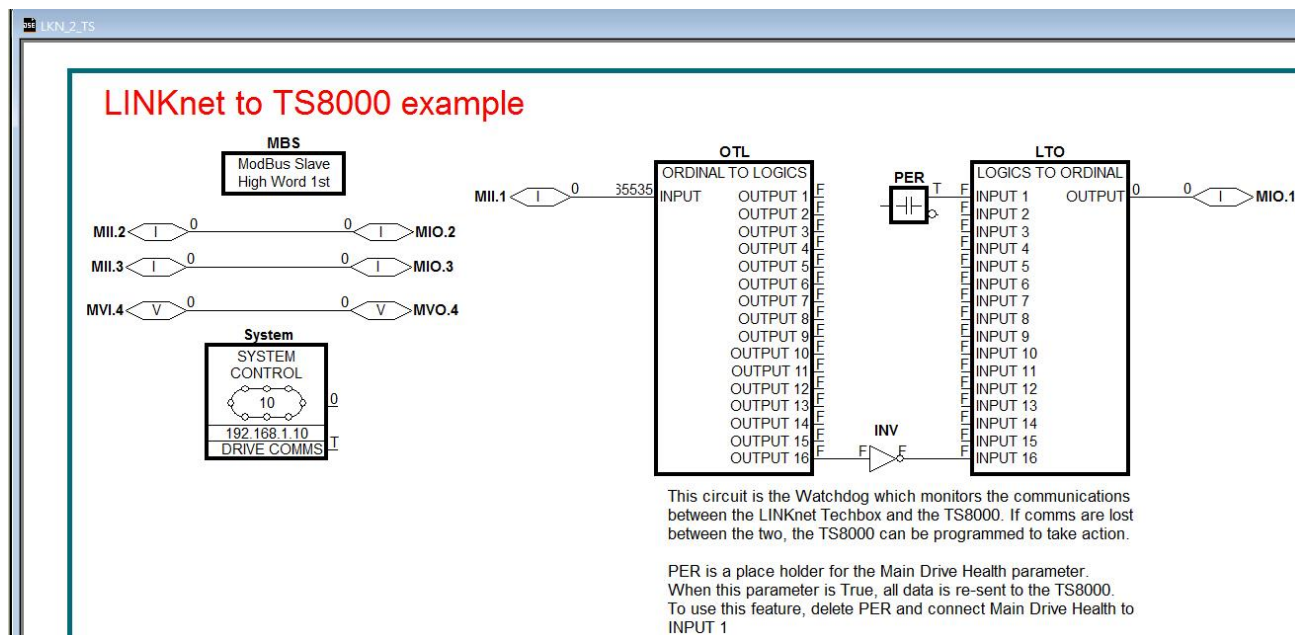
Output connector: the data is sent from LINKnet to the TS8000

The fieldbus connectors must be added before they will appear in the Ethernet function block.

The function block and connectors

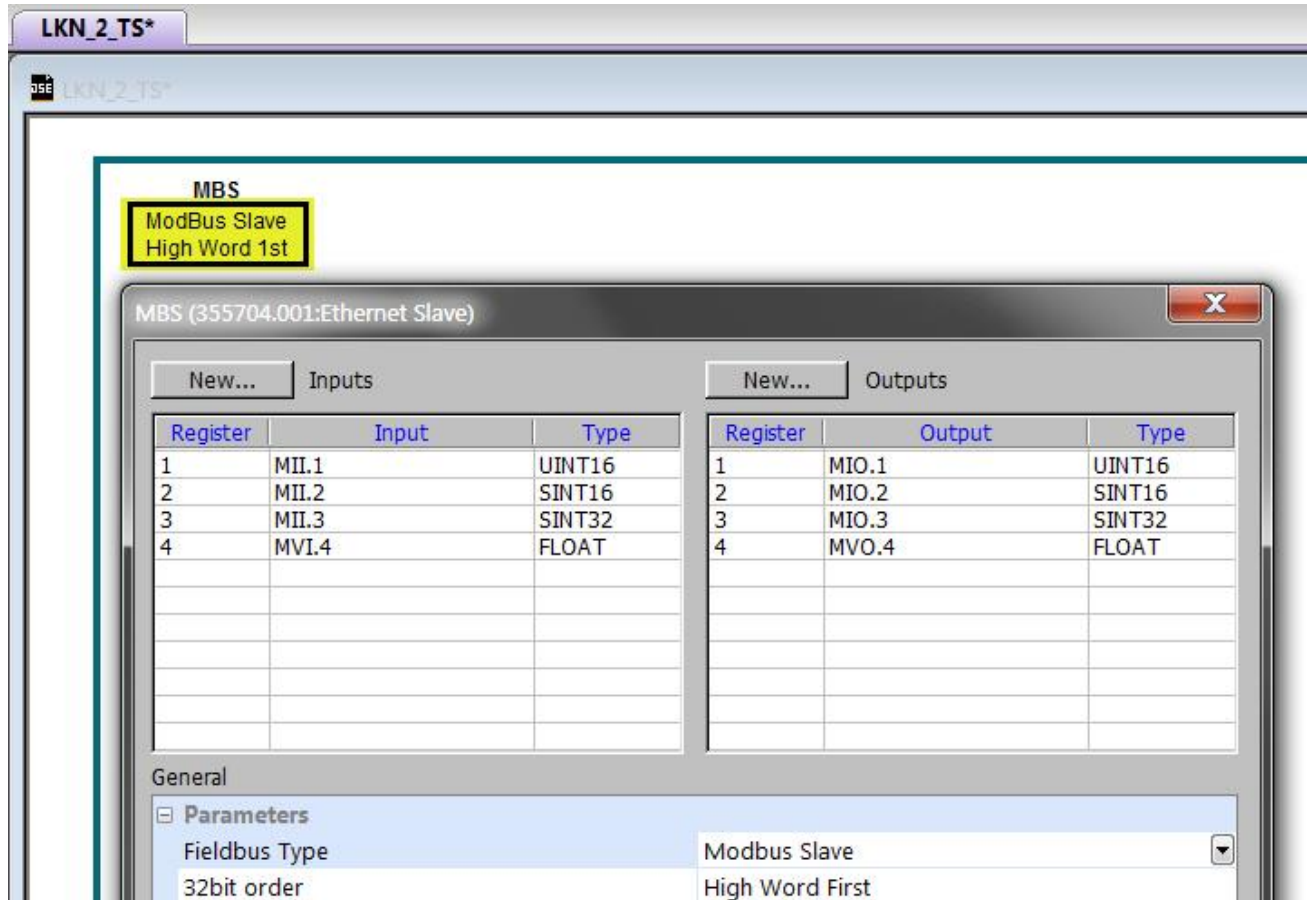


This example shows that *Integer Inputs & Outputs* were added along with a *Value Input & Output*.



Step 1.3: Configuring the Fieldbus Connectors

Double-click on the function block to display the dialog below. The fieldbus connectors (inputs and outputs) are assignable in the function block along with their data type to/from the TS8000.



“32bit order” is set to “High Word First”. This refers to how 32-bit data types, i.e. SINT32, UINT32 and FLOAT are encoded on Ethernet.

- **Low Word First** is sometimes referred to as “Modicon Mode” and is used when the least significant 16-bits are sent in a lower register number than the most significant 16-bits, i.e. Little-endian.
- **High Word First** is sometimes referred to as “IEEE Mode” and is used when the most significant 16-bits are sent in a lower register number than the least significant 16-bits, i.e. Big-endian. This mode must be selected when connecting to the TS8000 HMI.

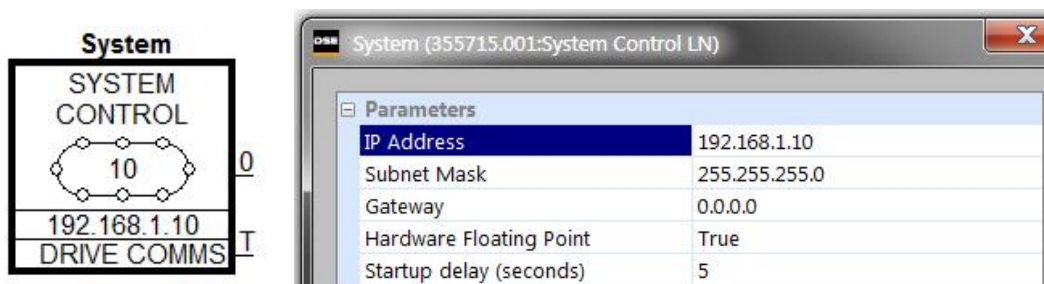
DSE Data Types

Data Type	Description	Range
LOGIC	Logic	False (F) and True (T)
INTEGER	32-bit signed integer	-2,147,483,648 to 2,147,483,647
VALUE	32-bit fixed point value	-32768.0 to 32767.9999

Ethernet Data Types

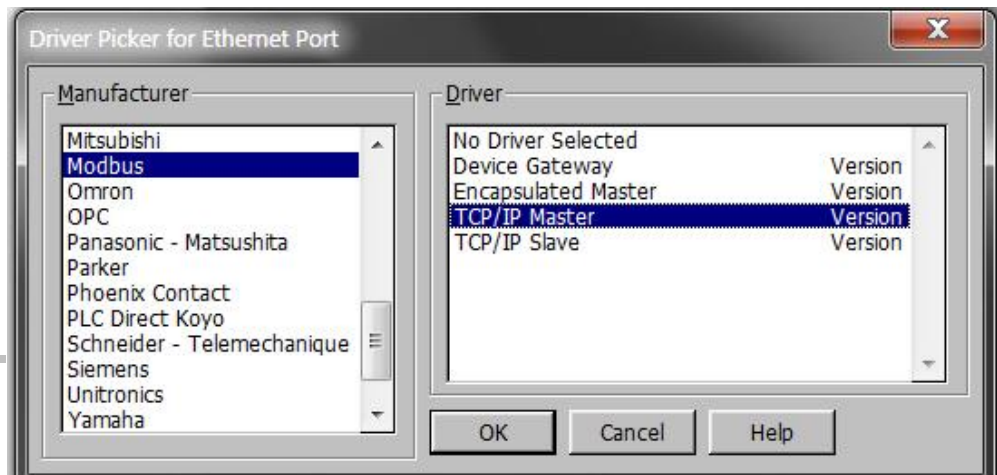
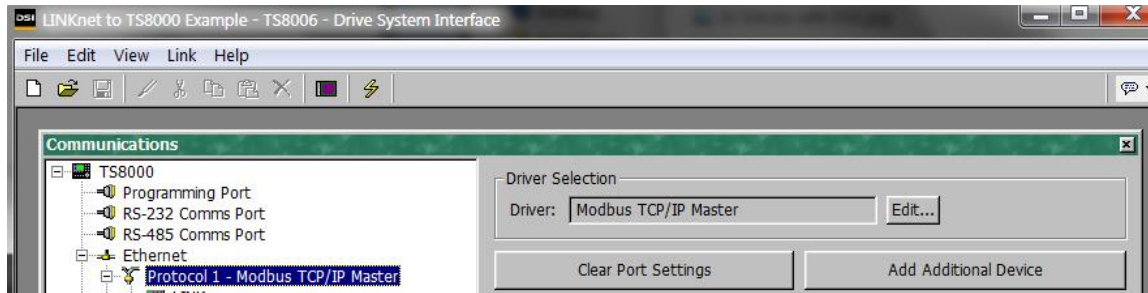
Data Type	Description	Range	Bytes Used
SINT16	16-bit signed integer	-32,768 to 32,767	2
SINT32	32-bit signed integer	-2,147,438,648 to 2,147,483,647	4
UINT16	16-bit unsigned integer	0 to 65,535	2
USINT32	32-bit unsigned integer	0 to 4,294,967,295	4
FLOAT	32-bit IEEE-754 floating-point value	1.19209290e-38 to 3.4028235e+38	4

Also, set up the *IP address* and the *Subnet Mask* in the *System Control* block as shown:

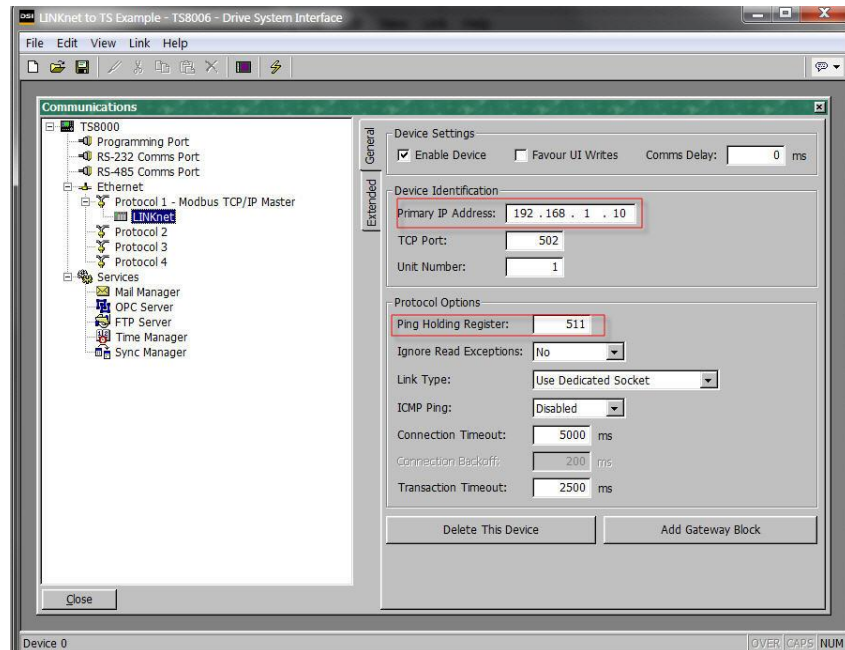


Setting up the TS8000 Operator Station using DSI8000

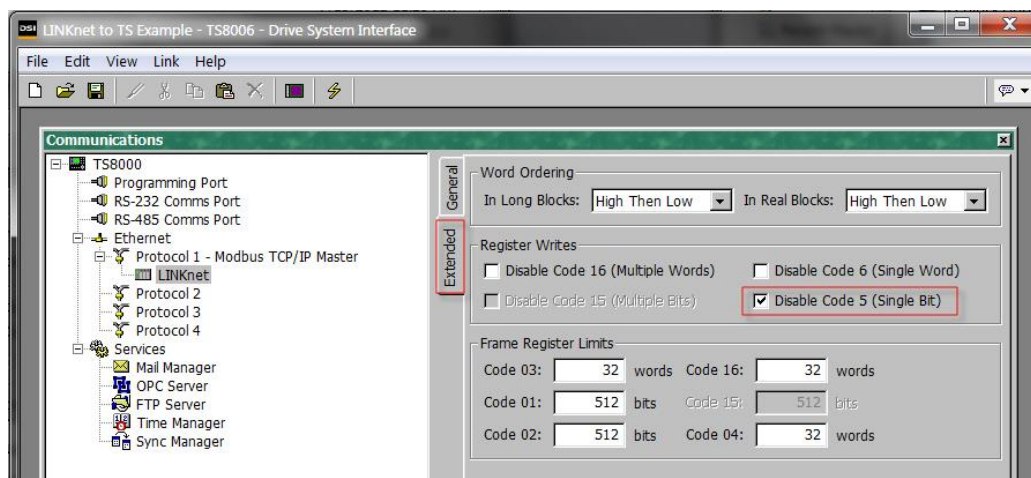
1. Select “Modbus TCP/IP Master” protocol for Ethernet Port. The TS8000 is the Master.



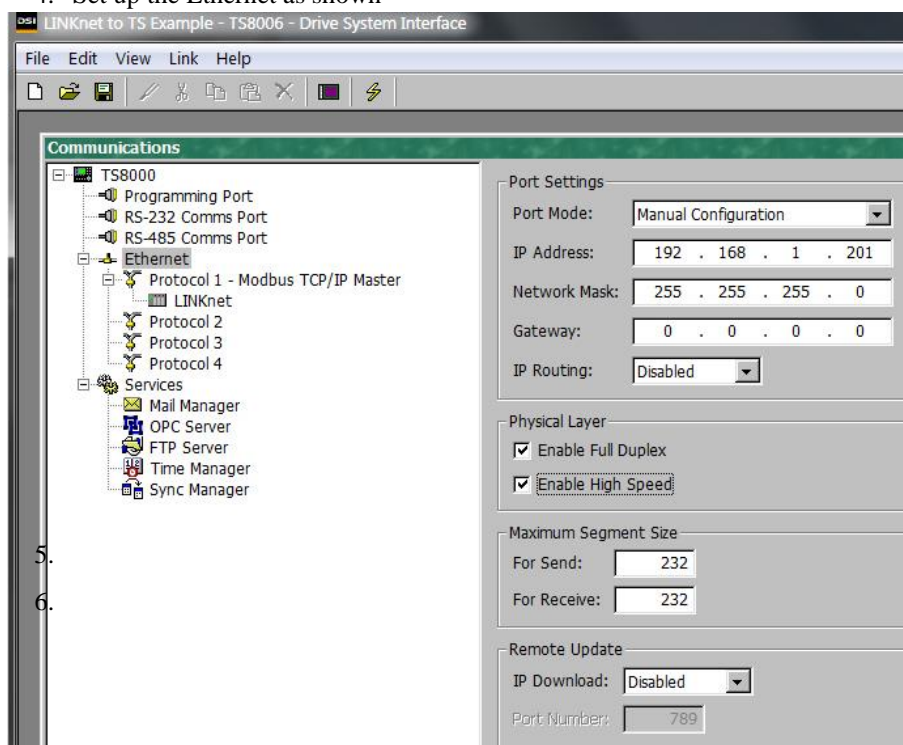
2. Set the *Primary IP Address*. The *Ping Holding Register* **MUST** be set to 511 or 0 which disables it.



3. In the *Extended* menu check the ‘Disable Code 5 (Single Bit)’’, as shown.

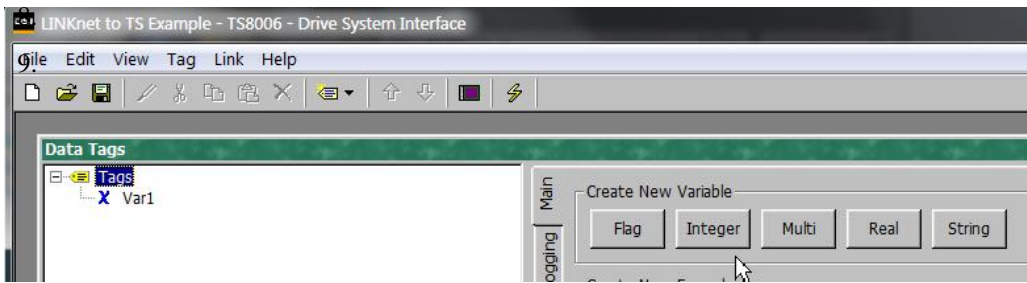


4. Set up the Ethernet as shown

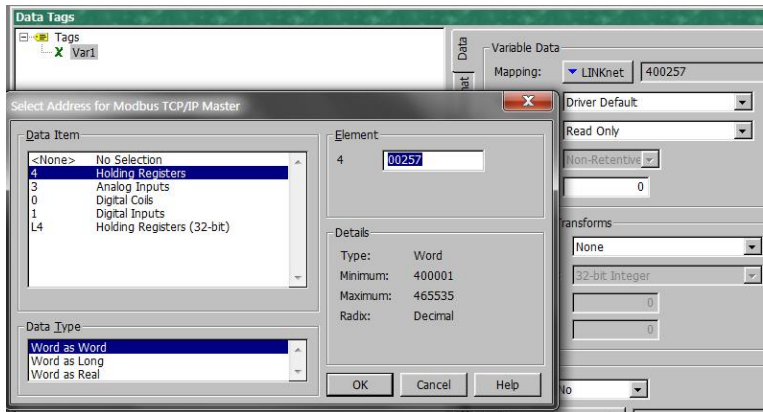


5.
6.

7. Create the Data Tags for reading and writing variables. Please see the example for pre-defined Data Tags.



8. Create the address tags. They are all pre-defined in the example.



Data Item:
Always select **Holding Registers** for both 16-bit and 32-bit data types. **DO NOT SELECT “Holding Registers (32-bit)”**.

Element:
Set to **00001** to write to the first Input variable declared in DSE.
Set to **00257** to read the first Output variable declared in DSE.

The element number then increments by 1 if the Data Type of the previous variable is **Word as Word**, otherwise it increments by 2.

Data Type:
Set as follows:

DSE Type	TS8000 Data Type
SINT16	Word as Word
UINT16	
SINT32	Word as Long
UINT32	
REAL	Word as Real

The Modbus interface is essentially the same as the 890. It on works on the holding registers (4xxxxx). Registers 400001 to 400256 are Input only (to LINKnet Module) and registers 400257 to 400512 are Output only (from LINKnet Module). There are no read/write registers. Each register is 16bits but two registers are used to read/write 32bit data values via Modbus TCP/IP. Whether one or two registers are used to transmit the data depends on the Input/Output Type selected in the Modbus Slave function block. The Input/Output Modbus function block selected determines the VM data format (Logic, Integer or Value) to be used to convert the VM data to the data being sent/received over Modbus. Typically, you would match the VM type to the Modbus type (Integer to SINT32 and Value to FLOAT), but there is no requirement to do this.

The following describes the conversion between VM inputs and how they are received via Modbus:

VM TYPE	MODBUS	# Reg	Description
Logic Input	SINT16	1	input = bit 0 of modbus register
Logic Input	UINT16	1	input = bit 0 of modbus register
Logic Input	SINT32	2	input = bit 0 of modbus register
Logic Input	UINT32	2	input = bit 0 of modbus register
Logic Input	FLOAT	2	input is 0 if input is 0.0, otherwise 1
Integer Input	SINT16	1	input = -32767 to 32767
Integer Input	UINT16	1	input = 0 to 65535
Integer Input	SINT32	2	input = -2147483647 to 2147483647
Integer Input	UINT32	2	input = 0 to 2147483647
Integer Input	FLOAT	2	input = -2147483647 to 2147483647
Value Input	SINT16	1	input = -32767.0 to 32767.0
Value Input	UINT16	1	input = -32767.0 to 32767.0 (same as SINT16)
Value Input	SINT32	2	input = -32767.0 to 32767.0
Value Input	UINT32	2	input = -32767.0 to 32767.0 (same as SINT32)
Value Input	FLOAT	2	IEEE format 32 converted to 16.16 value

The following describes the conversion between VM outputs and how they are sent via Modbus:

VM TYPE	MODBUS	# Reg	Description
Logic Output	SINT16	1	output is 0 if input is 0, otherwise 1
Logic Output	UINT16	1	output is 0 if input is 0, otherwise 1
Logic Output	SINT32	2	output is 0 if input is 0, otherwise 1
Logic Output	UINT32	2	output is 0 if input is 0, otherwise 1
Logic Output	FLOAT	2	0.0 or 1.0 sent as an IEEE format 32 floating point number
Integer Output	SINT16	1	output clamped in range -32767 to 32767
Integer Output	UINT16	1	output clamped in range 0 to 32767
Integer Output	SINT32	2	output from -2147483647 to 2147483647
Integer Output	UINT32	2	output treated an unsigned 32 bit number (0 to 4294967295)
Integer Output	FLOAT	2	output sent as an IEEE format 32 floating point number
Value Output	SINT16	1	output clamped in range -32767 to 32767
Value Output	UINT16	1	output clamped in range 0 to 32767
Value Output	SINT32	2	output from -2147483647 to 2147483647
Value Output	UINT32	2	output treated an unsigned 32 bit number (0 to 4294967295)
Value Output	FLOAT	2	output sent as an IEEE format 32 floating point number

Chapter 10 - Using Remote I/O

DSE contains function blocks, which allow LINKnet to communicate to SSD Recommended* Remote IO devices such as Analog IO and Digital IO as well as other types of hardware, which use the Modbus UDP protocol. There are function blocks in the *Block / Remote IO* menu: *Read Logics*, *Write Logics*, *Read Values* and *Write Values*. It does not matter where these hardware devices are located in the Remote IO rack when reading or writing data to these blocks. All the blocks care about is how many Digital modules there are and how many Analog modules there are.

Read Logics

MBRL

LOGIC 1 = 1

0.0.0.0

200 ms

LOGIC 1

LOGIC 2

LOGIC 3

LOGIC 4

LOGIC 5

LOGIC 6

LOGIC 7

LOGIC 8

LOGIC 9

LOGIC 10

LOGIC 11

LOGIC 12

LOGIC 13

LOGIC 14

LOGIC 15

LOGIC 16

Write Logics

MBWL

LOGIC 1 = 1

0.0.0.0

LOGIC COUNT

LOGIC 1

LOGIC 2

LOGIC 3

LOGIC 4

LOGIC 5

LOGIC 6

LOGIC 7

LOGIC 8

LOGIC 9

LOGIC 10

LOGIC 11

LOGIC 12

LOGIC 13

LOGIC 14

LOGIC 15

LOGIC 16

Value Writer

MBVW

REGISTER #1

0.0.0.0

INPUT

SCALE

OFFSET

Value Reader

MBVR

REG #1

200 ms

0.0.0.0

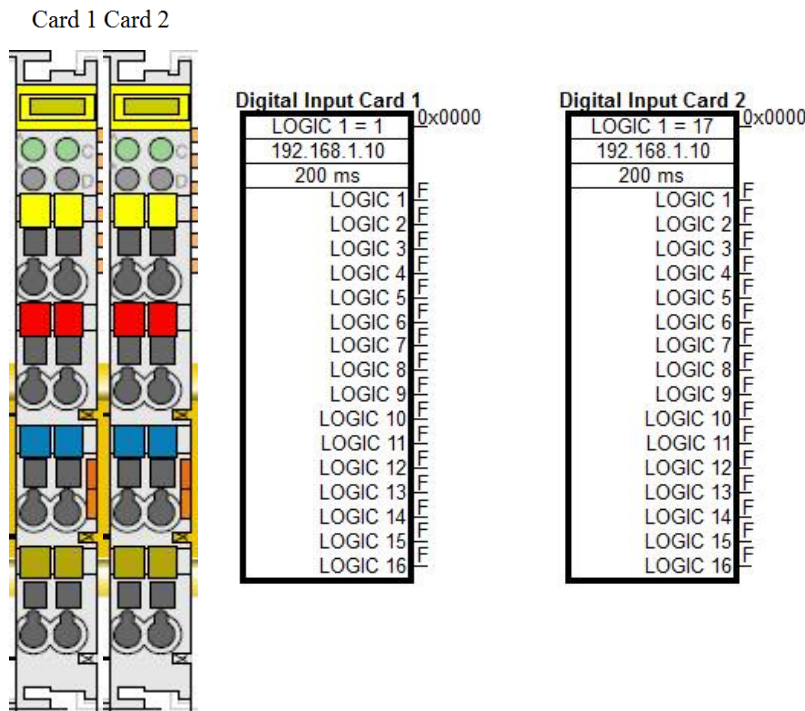
SCALE

OFFSET

For example, let’s say there are physically 2 Digital Input cards with 16 channels each. To access the 1st Digital Input card, you will use a *Read Logics* block and set the *IP address* of the Digital Input card. *Logic 1* parameter refers to the 1st Digital Input cards channel Input 1. *Logic 16* refers to the Digital Input channel 16 of this same card. Set the *First Logic Count* to 1. This will access the 1st set of 16 Logic Channels.

Now to access the parameters on the 2nd Digital Input card channels 1 to channel 16, add a second *Read Logics* function block and set the *First Logic Count* to 17. This will access the 2nd set of 16 Logic Channels. It does not make a difference where this 2nd Digital Input card is located in the Remote IO rack, as long as it is the 2nd Digital Input card located from left to right. There can be different types of cards in between these Digital Input cards and it will not affect how these Digital Input blocks are written to, or read from. Now to access this 2nd Digital Input card, use the 2nd *Read Logics* block parameters *Logic 1* to *Logic 16*.

Example of Digital Input cards 16 Inputs each card using the *Read Logics* blocks.



Example of 2 Digital Input 16 Channel Cards and the configuration to access these parameters using *Read Logics* blocks.

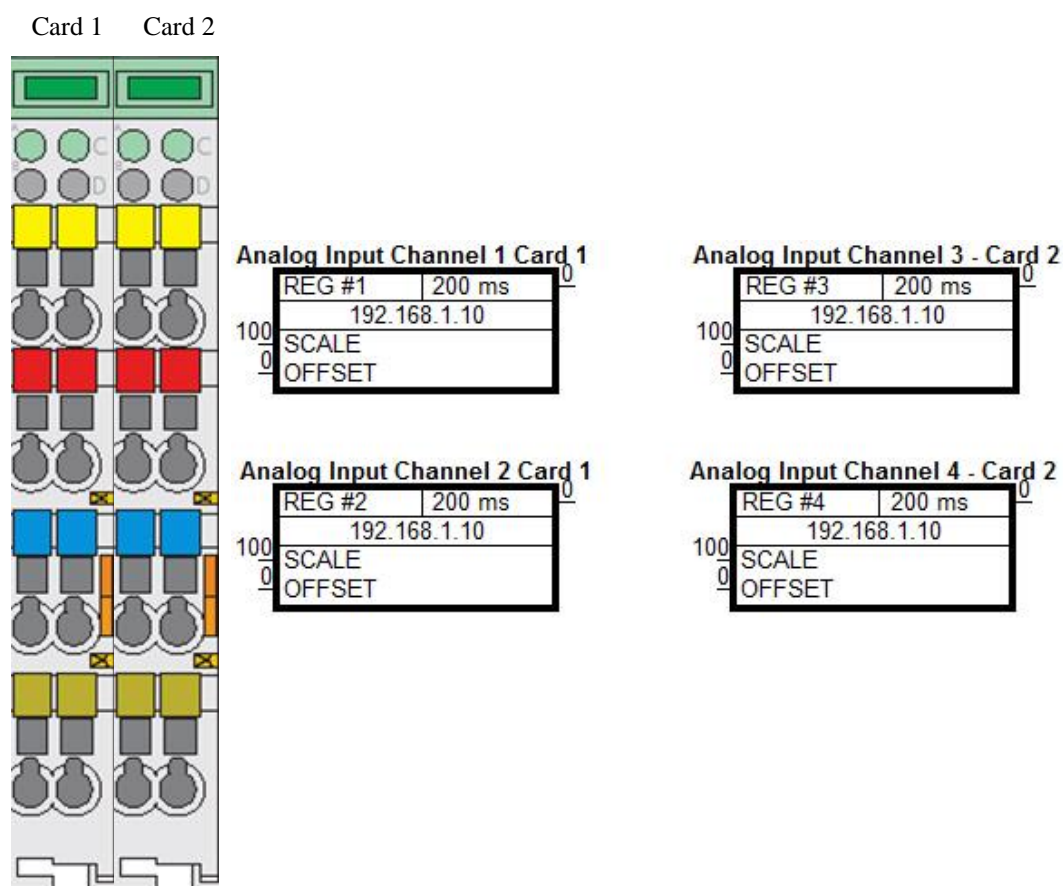
The above holds true for the *Write Logic* blocks also. It does not matter where the Digital Input or Digital Output modules are physically located in the Remote IO rack or what type of cards are installed in between these cards. All we care about is how many Digital Inputs cards there and they count from left to right.

As an example, when using Analog Input hardware modules the *Value Reader* function blocks are used to read data from these blocks. The same rules apply as above. We only care about how many Analog Input cards there are and they count from the left to right. There can be different types of cards between these Analog Input cards and they are ignored. Once the Value Reader block is placed in the configuration, enter the *Register* number. This is the hardware Analog Input location. If there are 2 Analog Inputs per module these 2 Inputs will be *Register 1* to *Register 2*. If a 2nd Analog input card is used, the Registers will be *Register 3* to *Register 4* etc.

Each LINKnet drive, supports up to 8 different, Remote IO, IP Addresses.

Note: The maximum number of IP Addresses will depend on the number and speed of IO modules and the bandwidth of the network.

Example of Analog Input card 2 Channels each card using the *Value Reader* blocks



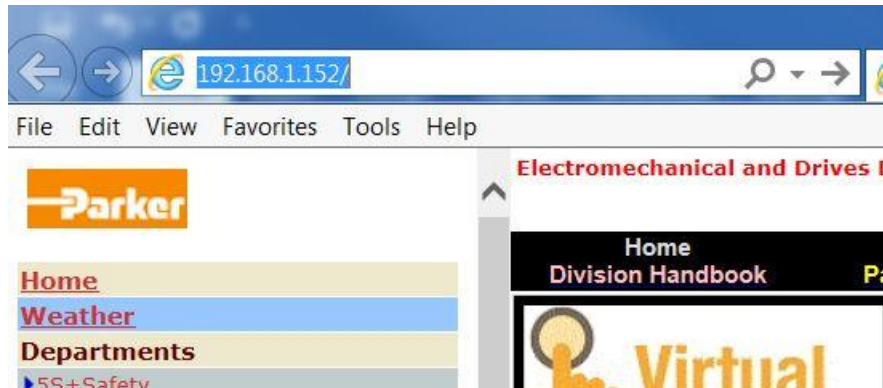
Example of 2 Analog Input 2 Channel Cards and the configuration to access these parameters using *Value Reader* blocks.

Note: If different LINKnet modules are writing data to the same IO point, the last module sending data will prevail.

Setting up Internal Watchdog on Wago I/O Coupler, 750-352

By default the internal watchdog on the Wago I/O coupler is set for an internal register that has to be set up using Modbus, and writing a specific value. There is an easier way to set up the watch dog so it will shut off all the outputs if communications are lost. The following procedure will outline the steps to follow to setup and enable the internal watch dog.

The settings for the 750-352 Wago I/O coupler can be accessed, by launching Windows explorer, and typing in the IP address. For this example, the IP address is 192.168.1.152. There needs to be an ethernet connection between the computer, and the Wago I/O coupler. Type in the IP address on the address line as follows. Then press the Enter button.



The following window should appear. On the left hand of the computer screen. Click on Watchdog.



Once you click on Watchdog, the following window will pop up for you to enter program mode on the Wago IO.



User name is admin, and Password is Wago. Now the following window should appear.

Modbus Watchdog	
State Modbus Watchdog:	Disabled
Watchdog Type :	Standard <input checked="" type="radio"/>
	Alternative <input type="radio"/>
Watchdog Timeout Value (100ms):	100
Watchdog Trigger Mask (F1 to F16):	0xFFFF
Watchdog Trigger Mask (F17 to F32):	0xFFFF

By default the Watchdog is disabled and set to standard. Click on the empty circle next to Alternative. The Watchdog timeout value is defaulted to 100, which means 100 x 100ms or 10000 msec or 10 sec. This is the time it will take to shut off the outputs once the communications have been lost to the Wago I/O coupler. Do not change the Trigger masks, they are OK at default values. Once finished click submit. It should ask for the login information again.

Now the power will need to be cycled on the Wago I/O. After the Power has been turned back on, Go back online using the Windows Explorer and make sure the Watch dog is now running. See below. Now if the Ethernet cable is unplugged or communication is lost to the Wago I/O, the watch dog will time out and all outputs will go to Zero.

NOTE: Once Communications are re-established, the Outputs will go to controlled state.

Watchdogs

page is for the configuration of the watchdogs. The configuration is stored in an EEPROM. Connection Time will take effect immediately. Changes of the Modbus Watchdog will take software or hardware reset. For more information see the manual.

Connection Watchdog

Connection Timeout Value (100ms) :

UNDO

SUBMIT

Modbus Watchdog

State Modbus Watchdog:	Running
Watchdog Type :	Standard <input type="radio"/>
	Alternative <input checked="" type="radio"/>
Watchdog Timeout Value (100ms):	<input type="text" value="100"/>
Watchdog Trigger Mask (F1 to F16):	<input type="text" value="0xFFFF"/>
Watchdog Trigger Mask (F17 to F32):	<input type="text" value="0xFFFF"/>

UNDO

SUBMIT

If it is desired to let LinkNet know if the Wago I/O coupler has stopped communication, the following block can be programmed into the LinkNet node that is controlling it.

RIOWD	
REG #1	900 ms
5000 ms	TIMED OUT
192.168.1.152	

-60
E

The Timed output will go to True if the Wago I/O quits talking for the Set time. In This example, the watchdog timeout is 5000ms or 5 sec.

Chapter 11 – Troubleshooting


Refer to the AC30 Series Drive Product Manual HA503711Uxxx for AC30 drive faults.

Duplicate Node Address

If there is a duplicate **Node** address, meaning that 2 or more nodes have the same **Node Address**, the GKP (Graphical Key pad) green Run button will flash and the GKP screen backlight will flash off /on, on the modules that have the duplicate addresses. To change the **Node Address** use DSE go to the **System Control** block and go to **Edit / Node Address** and change it.

Duplicate IP Address


If there is a duplicate **IP address**, meaning that 2 or more modules have the same **IP address**, the GKP

(Graphical Key pad) Ethernet icon  on the top row of the GKP menu will flash off /on, on the module which has the duplicate **IP address**. Also, the GKP backlight will flash off /on along with the red Stop button flashing in synchronization with the backlight flashing.

This modules **IP address** will be re assigned a temporary address, as its IP address is being used in a different module. If you go to the menu **Parameters / Base Comm / Ethernet State**, the **Ethernet State** will indicate **Duplicate Address**. To change the **IP Address** use DSE go to the **System Control** block and change it.

To clear this fault, power to the drive may have to be cycled off/on.

Active Ethernet connection

If there is an active Ethernet connection the Ethernet icon  on the top row of the GKP will appear and the IP address of the module will appear on the bottom row of the GKP (Graphical Key Pad)

Chapter 12 - Technical Specifications & Performance

Refer to the AC30 Series Drive Product Manual HA501718U002 for AC30 drive for Technical Specifications.

Performance

- An AC30P&D LINKnet drive has about 20,380 Nodes available. A Node is a measurement of storage units.
- An AC30V LINKnet drive has about 10,200 Nodes available.
- A LINKnet Techbox has about 12,600 Node available.
- With no Application data installed into the AC30 module it can process approximately 4000 messages / second.
 - A LINKnet module can process approximately 10,000 messages / second.
 - A Link 2 module can process approximately 1000 messages / second.
 - An 890 Drive can process approximately 2000 messages / second.
- Buss Speed:
 - A LINKnet module is Ethernet based with a buss speed of 100 Mbps.
 - A Link 2 fiber Optic module operates at 2.6 Mbps.
 - Just because the buss speed is faster in LINKnet, it doesn't mean that the data can be sent that fast. It must be processed first and then sent.

Chapter 13 - Recommended Auxiliary Products

Remote IO:

750-362*	Modbus TCP Fieldbus Coupler, 4th Generation
750-352	<i>Ethernet Fieldbus Coupler, 3rd Generation (Obsolete)</i>
750-600	End Module -Terminator
750-601	Power Supply Module 24 V DC, Fused (fuse not included)
CS475017U006	Fuse for above.
750-430	Digital Input Module 8 Channel DC 24 V
750-530	Digital Output Module 8 Channel DC 24 V
750-457	Analog Input Module 4 Channel $\pm 10\text{V}/0-10\text{V}$
750-557	Analog Output Module 4 Channel $\pm 10\text{V}/0-10\text{V}$

Note*: Use the 750-362 Modbus TCP coupler even if the PLC has an Ethernet/IP interface.

Unmanaged Ethernet switches:

N-Tron

Hirschman

Wago: SSD part number DV471068U003 for a 5 Port

SSD part number DV471068U005 for an 8 Port

Other Communication Networks:

Anybus X-Gateway Modbus TCP Master Gateway

Appendix A – AC30 Firmware Release Notes

LINKnet firmware version LN 1.7.4 DRV 2.19.4 for the AC30P/D drive

Fixes a bug which could, in rare cases, cause a drive enumerated parameter (such as an Analog Input Type) to not be properly set via DSE.

Fixes a potential nonvolatile memory issue on power up.

Updated the motor firmware to the latest version DRV 2.19.4

LINKnet firmware version LN 1.7.4 DRV 1.19.4 for the AC30V Drive

Fixes a bug which could, in rare cases, cause a drive enumerated parameter (such as an Analog Input Type) to not be properly set via DSE.

Updated the motor firmware to the latest version DRV 1.19.4

LINKnet firmware version LN 1.7.3 DRV 2.17.2 for the AC30P/D drive

Supports the 'Length Counter' and 'Reboot' function block.

Fixes a timer rollover in the Virtual Master that can cause the slave to run up to Max Speed.

LINKnet firmware version LN 1.7.3 DRV 1.17.2 for the AC30V Drive

Supports the 'Length Counter' and 'Reboot' function block.

LINKnet firmware version LN 1.7.1 DRV 2.17.2 for the AC30P/D drive

PTP loses lock after 36 hours, affecting Phase Locking applications to lose sync, has been fixed.

Updated the motor firmware to the latest version DRV 2.17.2

LINKnet firmware version LN 1.7.1 DRV 1.17.2 for the AC30V Drive

Updated the motor firmware to the latest version DRV 1.17.2

LINKnet firmware version LN 1.7.1 for the AC30P/D drive DRV 2.16.2

Fixed an issue where the Ethernet LEDs may randomly not enable on power up.

The *Sequence Logic* parameters: *Healthy* & *Output Contactor* now function properly.

LINKnet firmware version LN 1.7.1 for the AC30V Drive DRV 1.16.2

The *Sequence Logic* parameters: *Healthy* & *Output Contactor* now function properly.

LINKnet firmware version LN 1.7 for the AC30P/D drive DRV 2.16.2

Initial release of the Phase Locking for the AC30P/D Series.

Initial release of the 690Like Phase Locking for the AC30D Series.

Writing to Modbus / Ethernet IP Register Outputs caused the drive to crash. This has been fixed.

Reading Modbus Input registers is now supported.

Corrected some initialization issues with Ethernet IP.

Fixed an issue where there may be random loss of communications between modules.

Fixed an issue where the **Node Count** block may not update properly.

The **Black Box** and the **Data logger** now function in the AC30PD

The **Application Trip** block is now only active while the drive is running.

LINKnet firmware version LN 1.7 for the AC30V Drive DRV 1.16.2

Writing to Modbus / Ethernet IP Register Outputs caused the drive to crash. This has been fixed.
Reading Modbus Input registers is now supported.

Corrected some initialization issues with Ethernet IP.

Fixed an issue where there may be random loss of communications between modules.

Fixed an issue where the **Node Count** block may not update properly. 150

The **Data logger** now functions in the AC30V

The **Application Trip** block is now only active while the drive is running

LINKnet firmware version LN 1.6.3 for the AC30V and the AC30P/D drive.

The register sampling (for registers such as Reference/Speed Demand) timer was not properly reset when there is no activity for about 22 minutes. This has been fixed.

LINKnet firmware version LN 1.6.2 for the AC30V and the AC30P/D drive.

Some of the parameters may not get installed when installing a configuration. This has been fixed

LINKnet firmware version LN 1.6.1 for the AC30V drive.

Added support so the drive firmware can be installed by using DSE v3.08 (or later), thus the SD card is no longer required to install the drive firmware.

Any of the **Remote IO | Read and Reader** blocks did not correctly read the parameters. This was fixed.

LINKnet firmware version LN 1.6.1 for the AC30P and the AC30D drive.

Initial release of the AC30 firmware.

LINKnet firmware version LN 1.6 for the AC30V drives.

Initial release of the AC30 firmware.

Parker Worldwide

AE – UAE, Dubai
Tel: +971 4 8127100
parker.me@parker.com

AR – Argentina, Buenos Aires
Tel: +54 3327 44 4129

AT – Austria, Wiener Neustadt
Tel: +43 (0)2622 23501-0
parker.austria@parker.com

AT – Eastern Europe, Wiener Neustadt
Tel: +43 (0)2622 23501 900
parker.easteurope@parker.com

AU – Australia, Castle Hill
Tel: +61 (0)2-9634 7777

AZ – Azerbaijan, Baku
Tel: +994 50 2233 458
parker.azerbaijan@parker.com

BE/LU – Belgium, Nivelles
Tel: +32 (0)67 280 900
parker.belgium@parker.com

BR – Brazil, Cachoeirinha RS
Tel: +55 51 3470 9144

BY – Belarus, Minsk
Tel: +375 17 209 9399
parker.belarus@parker.com

CA – Canada, Milton, Ontario
Tel: +1 905 693 3000

CH – Switzerland, Etoy
Tel: +41 (0)21 821 87 00
parker.switzerland@parker.com

CL – Chile, Santiago
Tel: +56 2 623 1216

CN – China, Shanghai
Tel: +86 21 2899 5000

CZ – Czech Republic, Klecany
Tel: +420 284 083 111
parker.czechrepublic@parker.com

DE – Germany, Kaarst
Tel: +49 (0)2131 4016 0
parker.germany@parker.com

DK – Denmark, Ballerup
Tel: +45 43 56 04 00
parker.denmark@parker.com

ES – Spain, Madrid
Tel: +34 902 330 001
parker.spain@parker.com

FI – Finland, Vantaa
Tel: +358 (0)20 753 2500
parker.finland@parker.com

FR – France, Contamine s/Arve
Tel: +33 (0)4 50 25 80 25
parker.france@parker.com

GR – Greece, Athens
Tel: +30 210 933 6450
parker.greece@parker.com

HK – Hong Kong
Tel: +852 2428 8008

HU – Hungary, Budapest
Tel: +36 1 220 4155
parker.hungary@parker.com

IE – Ireland, Dublin
Tel: +353 (0)1 466 6370
parker.ireland@parker.com

IN – India, Mumbai
Tel: +91 22 6513 7081-85

IT – Italy, Corsico (MI)
Tel: +39 02 45 19 21
parker.italy@parker.com

JP – Japan, Tokyo
Tel: +81 (0)3 6408 3901

KR – South Korea, Seoul
Tel: +82 2 559 0400

KZ – Kazakhstan, Almaty
Tel: +7 7272 505 800
parker.easteurope@parker.com

LV – Latvia, Riga
Tel: +371 6 745 2601
parker.latvia@parker.com

MX – Mexico, Apodaca
Tel: +52 81 8156 6000

MY – Malaysia, Shah Alam
Tel: +60 3 7849 0800

NL – The Netherlands, Oldenzaal
Tel: +31 (0)541 585 000
parker.nl@parker.com

NO – Norway, Ski
Tel: +47 64 91 10 00
parker.norway@parker.com

NZ – New Zealand, Mt Wellington
Tel: +64 9 574 1744

PL – Poland, Warsaw
Tel: +48 (0)22 573 24 00
parker.poland@parker.com

PT – Portugal, Leca da Palmeira
Tel: +351 22 999 7360
parker.portugal@parker.com

RO – Romania, Bucharest
Tel: +40 21 252 1382
parker.romania@parker.com

RU – Russia, Moscow
Tel: +7 495 645-2156
parker.russia@parker.com

SE – Sweden, Spånga
Tel: +46 (0)8 59 79 50 00
parker.sweden@parker.com

SG – Singapore
Tel: +65 6887 6300

SK – Slovakia, Banská Bystrica
Tel: +421 484 162 252
parker.slovakia@parker.com

SL – Slovenia, Novo Mesto
Tel: +386 7 337 6650
parker.slovenia@parker.com

TH – Thailand, Bangkok
Tel: +662 717 8140

TR – Turkey, Istanbul
Tel: +90 216 4997081
parker.turkey@parker.com

TW – Taiwan, Taipei
Tel: +886 2 2298 8987

UA – Ukraine, Kiev
Tel: +380 44 494 2731
parker.ukraine@parker.com

UK – United Kingdom, Warwick
Tel: +44 (0)1926 317 878
parker.uk@parker.com

US – USA, Cleveland
Tel: +1 216 896 3000

VE – Venezuela, Caracas
Tel: +58 212 238 5422

ZA – South Africa, Kempton Park
Tel: +27 (0)11 961 0700
parker.southafrica@parker.com

