# Ethernet – Drive Link
# Profinet IO (Modbus TCP) to ACV700/DCV700

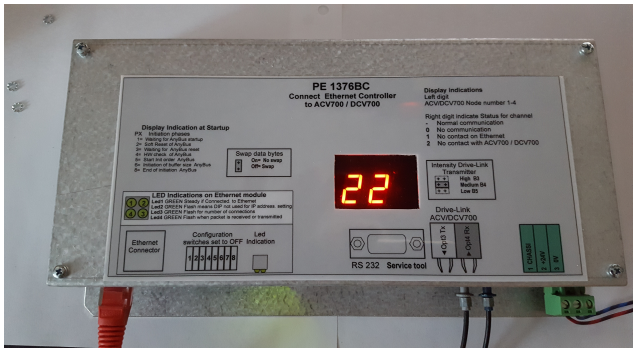
## 1. GENERAL

**PE1376PN** make it possible to connect ACV/DCV700 to Profinet IO (or Modbus TCP) without using a APC. The application program in APC must be moved to the Profinet IO Master.
The **PE1376PN** is a converter connected to ethernet Profinet IO on one side and Drive Link protocol on the other side. This unit make it possible to connect 4 ACV700/DCV700 to an Profinet IO master. 10 or 100Mbit on Ethernet side and 1.5Mbit on the Drive Link protocol.
Max 14 Integer values can be send to the Drive and max 15 Integer values can be read from the Drive. The signal addresses is set from Ethernet Scanner.
The PE1376PN contains a 2 characters display for status indication.

## 2. TECHNICAL DESCRIPTION

### 2.1 Dimension and mounting

To obtain the best immunity to electric noise the PE1376PN must be electrically connected to cubicle through 4 M5 screws in each corner (M5 Screw pos 220mm x135mm).
Dimensions
Size: 240mm x 145mm (w x h)
Required mounting deep: 35mm




### 2.2 Technical data

Auxiliary Power
+24V DC (12-30V DC), typical 120mA(3W), at startup 1A 10ms,Max fuse: 4A

**Drive Link Communication**
PE1376PN is Master on Drive Link Protocol and can handle up to 4 ACV700/DCV700.
PE1376PN can be connected with 1.0mm plastic fiber POF
If there are 2-4 drives connected, an optical distributor YPC 111 A is needed.
Transmission speeds 1.5Mbit/s

**Communication on Ethernet**
PE1376PN is acting as a slave on Profinet IO.
Supported speeds are 10 or 100M Bit

Enclosure class
IP00

Environmental data
Operation +5..+40 degrees C.,Storage -40..+70 degrees C.

### 2.2.1 Strapping

| STRAPPING | DEFAULT | FUNCTION |
|---|---|---|
| B3 | OFF | High Drive link transmitter intensity |
| B4 | ON | Medium Drive link transmitter intensity |
| B5 | OFF | Low Drive link transmitter intensity |
| B10 | ON | On=No byte swap, Off= Byte swap |

### 2.3 Status display 2 digits

First digit shows actual DriveLink node addr 1-4
When communication to Ethernet is broken then communication with ACV/DCV700 will automatic stop.
Status indication 1 will only last for a short time and then 0 will be displayed.
This because PE1376PN will automatic stop communication to ACV/DCV700 if communication on Ethernet will fail.

| SECOND DIGIT | STATUS |
|---|---|
| 0 | No contact on Ethernet |
| 1 | Contact with ACV/DCV700 but no contact on Ethernet |
| 2 | Contact on Ethernet but no contact with ACV/DCV700 |
| - | Communication is OK |

### 2.4 Connections

| TERMINAL | FUNCTION |
|---|---|
| | |
| P1 | Chassi |
| P2 | +24V DC Power supply |
| P3 | 0V |
| | |
| 9 pole Dsub | Service aid, RS232 19200 baud Modbus RTU slave |
| 2 | Txd RS232 |
| 3 | Rxd RS232 |
| 5 | 0V |
| | |
| RJ45 | Standard Ethernet connection |

# Ethernet – Drive Link
# Profinet IO (Modbus TCP) to ACV700/DCV700

## 2.5 Mapping of Signals from/to Ethernet to ACV700/DCV700

| **Data →** | | **ACV/DCV700 Node 1 Data from Ethernet** | |
|---|---|---|---|
| Modbus / | Index | | |
| 41025 | 0 | DRTRA(0) DS90 | Basic Data 1 |
| 41026 | 1 | | Basic Data 2 |
| 41027 | 2 | | Basic Data 3 |
| 41028 | 3 | DRTRA(1) DS1 | Normal Cyclic Data 1 |
| 41029 | 4 | | Normal Cyclic Data 2 |
| 41030 | 5 | | Normal Cyclic Data 3 |
| 41031 | 6 | | Normal Cyclic Data 4 |
| 41032 | 7 | APC element DRTRA(1) DS3 | Normal Cyclic Data 5 |
| 41033 | 8 | | Normal Cyclic Data 6 |
| 41034 | 9 | | Normal Cyclic Data 7 |
| 41035 | 10 | | Normal Cyclic Data 8 |
| 41036 | 11 | | Normal Cyclic Data 9 |
| 41037 | 12 | | Normal Cyclic Data 10 |
| 41038 | 13 | | Normal Cyclic Data 11 |
| 41039 | 14 | CONTROL | PE1376B/PD Control Bit0=Start ACV/DCV communication |
| **Parameters** | | **Configuration of data from ACV/DCV700** | |
| 41121 | 96 | DRREC(0) DS91 | BASIC Message Scan ms |
| 41122 | 97 | | IND1 Drive signal index Basic |
| 41123 | 98 | | IND2 Drive signal index Basic |
| 41124 | 99 | | IND3 Drive signal index Basic |
| 41125 | 100 | DRREC(1) DS2 | Normal Message1 Scan ms |
| 41126 | 101 | | IND1 Drive signal index Normal Cyclic data |
| 41127 | 102 | | IND2 Drive signal index Normal Cyclic data |
| 41128 | 103 | | IND3 Drive signal index Normal Cyclic data |
| 41129 | 104 | | IND4 Drive signal index Normal Cyclic data |
| 41130 | 105 | APC element DRREC(1) DS4 | Normal Message 2 Scan ms |
| 41131 | 106 | | IND5 Drive signal index Normal Cyclic data |
| 41132 | 107 | | IND6 Drive signal index Normal Cyclic data |
| 41133 | 108 | | IND7 Drive signal index Normal Cyclic data |
| 41134 | 109 | | IND8 Drive signal index Normal Cyclic data |
| 41135 | 110 | | IND9 Drive signal index Normal Cyclic data |
| 41136 | 111 | | IND10 Drive signal index Normal Cyclic data |
| 41137 | 112 | | IND11 Drive signal index Normal Cyclic data |
| 41138 | 113 | | IND12 Drive signal index Normal Cyclic data |
| | | **Configuration of data to ACV/DCV700** | |
| 41139 | 114 | DRTRA(0) DS90 | IND1 Drive signal index Basic |
| 41140 | 115 | | IND2 Drive signal index Basic |
| 41141 | 116 | | IND3 Drive signal index Basic |
| 41142 | 117 | DRTRA(1) DS1 | IND1 Drive signal index Normal Cyclic data |
| 41143 | 118 | | IND2 Drive signal index Normal Cyclic data |
| 41144 | 119 | | IND3 Drive signal index Normal Cyclic data |
| 41145 | 120 | | IND4 Drive signal index Normal Cyclic data |
| 41146 | 121 | APC element DRTRA(1) DS3 | IND5 Drive signal index Normal Cyclic data |
| 41147 | 122 | | IND6 Drive signal index Normal Cyclic data |
| 41148 | 123 | | IND7 Drive signal index Normal Cyclic data |
| 41149 | 124 | | IND8 Drive signal index Normal Cyclic data |
| 41150 | 125 | | IND9 Drive signal index Normal Cyclic data |
| 41151 | 126 | | IND10 Drive signal index Normal Cyclic data |
| 41152 | 127 | | IND11 Drive signal index Normal Cyclic data |

# Ethernet – Drive Link
# Profinet IO (Modbus TCP) to ACV700/DCV700

**ACV/DCV700 Node 1 Data from Drive to Ethernet**

| **Ethernet Data ←** | | **ACV/DCV700 Node 1 Data from Drive to Ethernet** | |
|---|---|---|---|
| Modbus / | Index | | |
| 40001 | 0 | DRREC(0) DS91 | Basic Data 1 |
| 40002 | 1 | | Basic Data 2 |
| 40003 | 2 | | Basic Data 3 |
| 40004 | 3 | DRREC(1) DS2 | Normal Cyclic Data 1 |
| 40005 | 4 | | Normal Cyclic Data 2 |
| 40006 | 5 | | Normal Cyclic Data 3 |
| 40007 | 6 | | Normal Cyclic Data 4 |
| 40008 | 7 | APC element DRTRA(1) DS4 | Normal Cyclic Data 5 |
| 40009 | 8 | | Normal Cyclic Data 6 |
| 40010 | 9 | | Normal Cyclic Data 7 |
| 40011 | 10 | | Normal Cyclic Data 8 |
| 40012 | 11 | | Normal Cyclic Data 9 |
| 40013 | 12 | | Normal Cyclic Data 10 |
| 40014 | 13 | | Normal Cyclic Data 11 |
| | | | |
| **Status information from PE1376B/PD converter** | | | |
| 40015 | 14 | CONNECTSTATUS ACV/DCV700 see description below | |
| 40016 | 15 | CON_STS see TC-LINK Protocol description | |
| 40017 | 16 | TC_STS see TC-LINK Protocol description | |
| 40018 | 17 | NRR_DS see TC-LINK Protocol description | |
| 40019 | 18 | NRT_DS see TC-LINK Protocol description | |
| 40020 | 19 | TIMEOUT counter Drive Link, Number of timeouts on drive link | |

# Ethernet – Drive Link
# Profinet IO (Modbus TCP) to ACV700/DCV700

**ACV/DCV700 Node 2 Data from Ethernet**

| **Data →** | | **ACV/DCV700** | |
|---|---|---|---|
| Modbus / | Index | | |
| 41045 | 20 | DRTRA(0) DS90 | Basic Data 1 |
| 41046 | 21 | | Basic Data 2 |
| 41047 | 22 | | Basic Data 3 |
| 41048 | 23 | DRTRA(1) DS1 | Normal Cyclic Data 1 |
| 41049 | 24 | | Normal Cyclic Data 2 |
| 41050 | 25 | | Normal Cyclic Data 3 |
| 41051 | 26 | | Normal Cyclic Data 4 |
| 41052 | 27 | APC element DRTRA(1) DS3 | Normal Cyclic Data 5 |
| 41053 | 28 | | Normal Cyclic Data 6 |
| 41054 | 29 | | Normal Cyclic Data 7 |
| 41055 | 30 | | Normal Cyclic Data 8 |
| 41056 | 31 | | Normal Cyclic Data 9 |
| 41057 | 32 | | Normal Cyclic Data 10 |
| 41058 | 33 | | Normal Cyclic Data 11 |
| 41059 | 34 | CONTROL | PE1376B/PD Control Bit0=Start ACV/DCV communication |
| **Parameters** | | **Configuration of data from ACV/DCV700** | |
| 41153 | 128 | DRREC(0) DS91 | BASIC Message Scan ms |
| 41154 | 129 | | IND1 Drive signal index Basic |
| 41155 | 130 | | IND2 Drive signal index Basic |
| 41156 | 131 | | IND3 Drive signal index Basic |
| 41157 | 132 | DRREC(1) DS2 | Normal Message1 Scan ms |
| 41158 | 133 | | IND1 Drive signal index Normal Cyclic data |
| 41159 | 134 | | IND2 Drive signal index Normal Cyclic data |
| 41160 | 135 | | IND3 Drive signal index Normal Cyclic data |
| 41161 | 136 | | IND4 Drive signal index Normal Cyclic data |
| 41162 | 137 | APC element DRREC(1) DS4 | Normal Message 2 Scan ms |
| 41163 | 138 | | IND5 Drive signal index Normal Cyclic data |
| 41164 | 139 | | IND6 Drive signal index Normal Cyclic data |
| 41165 | 140 | | IND7 Drive signal index Normal Cyclic data |
| 41166 | 141 | | IND8 Drive signal index Normal Cyclic data |
| 41167 | 142 | | IND9 Drive signal index Normal Cyclic data |
| 41168 | 143 | | IND10 Drive signal index Normal Cyclic data |
| 41169 | 144 | | IND11 Drive signal index Normal Cyclic data |
| 41170 | 145 | | IND12 Drive signal index Normal Cyclic data |
| | | **Configuration of data to ACV/DCV700** | |
| 41171 | 146 | DRTRA(0) DS90 | IND1 Drive signal index Basic |
| 41172 | 147 | | IND2 Drive signal index Basic |
| 41173 | 148 | | IND3 Drive signal index Basic |
| 41174 | 149 | DRTRA(1) DS1 | IND1 Drive signal index Normal Cyclic data |
| 41175 | 150 | | IND2 Drive signal index Normal Cyclic data |
| 41176 | 151 | | IND3 Drive signal index Normal Cyclic data |
| 41177 | 152 | | IND4 Drive signal index Normal Cyclic data |
| 41178 | 153 | APC element DRTRA(1) DS3 | IND5 Drive signal index Normal Cyclic data |
| 41179 | 154 | | IND6 Drive signal index Normal Cyclic data |
| 41180 | 155 | | IND7 Drive signal index Normal Cyclic data |
| 41181 | 156 | | IND8 Drive signal index Normal Cyclic data |
| 41182 | 157 | | IND9 Drive signal index Normal Cyclic data |
| 41183 | 158 | | IND10 Drive signal index Normal Cyclic data |
| 41184 | 159 | | IND11 Drive signal index Normal Cyclic data |

# Ethernet – Drive Link
# Profinet IO (Modbus TCP) to ACV700/DCV700

**ACV/DCV700 Node 2 Data from Drive to Ethernet**

| **Ethernet Data ←** | | **ACV/DCV700** | |
|---|---|---|---|
| Modbus / | Index | | |
| 40021 | 20 | DRREC(0) DS91 | Basic Data 1 |
| 40022 | 21 | | Basic Data 2 |
| 40023 | 22 | | Basic Data 3 |
| 40024 | 23 | DRREC(1) DS2 | Normal Cyclic Data 1 |
| 40025 | 24 | | Normal Cyclic Data 2 |
| 40026 | 25 | | Normal Cyclic Data 3 |
| 40027 | 26 | | Normal Cyclic Data 4 |
| 40028 | 27 | APC element DRTRA(1) DS4 | Normal Cyclic Data 5 |
| 40029 | 28 | | Normal Cyclic Data 6 |
| 40030 | 29 | | Normal Cyclic Data 7 |
| 40031 | 30 | | Normal Cyclic Data 8 |
| 40032 | 31 | | Normal Cyclic Data 9 |
| 40033 | 32 | | Normal Cyclic Data 10 |
| 40034 | 33 | | Normal Cyclic Data 11 |
| | | | |
| **Status information from PE1376B/PD converter** | | | |
| 40035 | 34 | CONNECTSTATUS ACV/DCV700 see description below | |
| 40036 | 35 | CON_STS see TC-LINK Protocol description | |
| 40037 | 36 | TC_STS see TC-LINK Protocol description | |
| 40038 | 37 | NRR_DS see TC-LINK Protocol description | |
| 40039 | 38 | NRT_DS see TC-LINK Protocol description | |
| 40040 | 39 | TIMEOUT counter Drive Link, Number of timeouts on drive link | |

# Ethernet – Drive Link
# Profinet IO (Modbus TCP) to ACV700/DCV700

**ACV/DCV700 Node 3 Data from Ethernet**

| **Data →** | | **ACV/DCV700** | |
|---|---|---|---|
| Modbus / | Index | | |
| 41065 | 40 | DRTRA(0) DS90 | Basic Data 1 |
| 41066 | 41 | | Basic Data 2 |
| 41067 | 42 | | Basic Data 3 |
| 41068 | 43 | DRTRA(1) DS1 | Normal Cyclic Data 1 |
| 41069 | 44 | | Normal Cyclic Data 2 |
| 41070 | 45 | | Normal Cyclic Data 3 |
| 41071 | 46 | | Normal Cyclic Data 4 |
| 41072 | 47 | APC element DRTRA(1) DS3 | Normal Cyclic Data 5 |
| 41073 | 48 | | Normal Cyclic Data 6 |
| 41074 | 49 | | Normal Cyclic Data 7 |
| 41075 | 50 | | Normal Cyclic Data 8 |
| 41076 | 51 | | Normal Cyclic Data 9 |
| 41077 | 52 | | Normal Cyclic Data 10 |
| 41078 | 53 | | Normal Cyclic Data 11 |
| 41079 | 54 | CONTROL | PE1376B/PD Control Bit0=Start ACV/DCV communication |
| **Parameters** | | **Configuration of data from ACV/DCV700** | |
| 41185 | 160 | DRREC(0) DS91 | BASIC Message Scan ms |
| 41186 | 161 | | IND1 Drive signal index Basic |
| 41187 | 162 | | IND2 Drive signal index Basic |
| 41188 | 163 | | IND3 Drive signal index Basic |
| 41189 | 164 | DRREC(1) DS2 | Normal Message1 Scan ms |
| 41190 | 165 | | IND1 Drive signal index Normal Cyclic data |
| 41191 | 166 | | IND2 Drive signal index Normal Cyclic data |
| 41192 | 167 | | IND3 Drive signal index Normal Cyclic data |
| 41193 | 168 | | IND4 Drive signal index Normal Cyclic data |
| 41194 | 169 | APC element DRREC(1) DS4 | Normal Message 2 Scan ms |
| 41195 | 170 | | IND5 Drive signal index Normal Cyclic data |
| 41196 | 171 | | IND6 Drive signal index Normal Cyclic data |
| 41197 | 172 | | IND7 Drive signal index Normal Cyclic data |
| 41198 | 173 | | IND8 Drive signal index Normal Cyclic data |
| 41199 | 174 | | IND9 Drive signal index Normal Cyclic data |
| 41200 | 175 | | IND10 Drive signal index Normal Cyclic data |
| 41201 | 176 | | IND11 Drive signal index Normal Cyclic data |
| 41202 | 177 | | IND12 Drive signal index Normal Cyclic data |
| | | **Configuration of data to ACV/DCV700** | |
| 41203 | 178 | DRTRA(0) DS90 | IND1 Drive signal index Basic |
| 41204 | 179 | | IND2 Drive signal index Basic |
| 41205 | 180 | | IND3 Drive signal index Basic |
| 41206 | 181 | DRTRA(1) DS1 | IND1 Drive signal index Normal Cyclic data |
| 41207 | 182 | | IND2 Drive signal index Normal Cyclic data |
| 41208 | 183 | | IND3 Drive signal index Normal Cyclic data |
| 41209 | 184 | | IND4 Drive signal index Normal Cyclic data |
| 41210 | 185 | APC element DRTRA(1) DS3 | IND5 Drive signal index Normal Cyclic data |
| 41211 | 186 | | IND6 Drive signal index Normal Cyclic data |
| 41212 | 187 | | IND7 Drive signal index Normal Cyclic data |
| 41213 | 188 | | IND8 Drive signal index Normal Cyclic data |
| 41214 | 189 | | IND9 Drive signal index Normal Cyclic data |
| 41215 | 190 | | IND10 Drive signal index Normal Cyclic data |
| 41216 | 191 | | IND11 Drive signal index Normal Cyclic data |

# Ethernet – Drive Link
# Profinet IO (Modbus TCP) to ACV700/DCV700

**ACV/DCV700 Node 3 Data from Drive to Ethernet**

| **Ethernet Data ←** | | **ACV/DCV700 Node 3 Data from Drive to Ethernet** | |
|---|---|---|---|
| Modbus / | Index | | |
| 40041 | 40 | DRREC(0) DS91 | Basic Data 1 |
| 40042 | 41 | | Basic Data 2 |
| 40043 | 42 | | Basic Data 3 |
| 40044 | 43 | DRREC(1) DS2 | Normal Cyclic Data 1 |
| 40045 | 44 | | Normal Cyclic Data 2 |
| 40046 | 45 | | Normal Cyclic Data 3 |
| 40047 | 46 | | Normal Cyclic Data 4 |
| 40048 | 47 | APC element DRTRA(1) DS4 | Normal Cyclic Data 5 |
| 40049 | 48 | | Normal Cyclic Data 6 |
| 40050 | 49 | | Normal Cyclic Data 7 |
| 40051 | 50 | | Normal Cyclic Data 8 |
| 40052 | 51 | | Normal Cyclic Data 9 |
| 40053 | 52 | | Normal Cyclic Data 10 |
| 40054 | 53 | | Normal Cyclic Data 11 |
| | | | |
| **Status information from PE1376B/PD converter** | | | |
| 40055 | 54 | CONNECTSTATUS ACV/DCV700 see description below | |
| 40056 | 55 | CON_STS see TC-LINK Protocol description | |
| 40057 | 56 | TC_STS see TC-LINK Protocol description | |
| 40058 | 57 | NRR_DS see TC-LINK Protocol description | |
| 40059 | 58 | NRT_DS see TC-LINK Protocol description | |
| 40060 | 59 | TIMEOUT counter Drive Link, Number of timeouts on drive link | |

# Ethernet – Drive Link
# Profinet IO (Modbus TCP) to ACV700/DCV700

**ACV/DCV700 Node 4 Data from Ethernet**

| **Data →** | | **ACV/DCV700 Node 4 Data from Ethernet** | |
|---|---|---|---|
| Modbus / | Index | | |
| 41085 | 60 | DRTRA(0) DS90 | Basic Data 1 |
| 41086 | 6 | | Basic Data 2 |
| 41087 | 62 | | Basic Data 3 |
| 41088 | 63 | DRTRA(1) DS1 | Normal Cyclic Data 1 |
| 41089 | 64 | | Normal Cyclic Data 2 |
| 41090 | 65 | | Normal Cyclic Data 3 |
| 41091 | 66 | | Normal Cyclic Data 4 |
| 41092 | 67 | APC element DRTRA(1) DS3 | Normal Cyclic Data 5 |
| 41093 | 68 | | Normal Cyclic Data 6 |
| 41094 | 69 | | Normal Cyclic Data 7 |
| 41095 | 70 | | Normal Cyclic Data 8 |
| 41096 | 71 | | Normal Cyclic Data 9 |
| 41097 | 72 | | Normal Cyclic Data 10 |
| 41098 | 73 | | Normal Cyclic Data 11 |
| 41099 | 74 | CONTROL | PE1376B/PD Control Bit0=Start ACV/DCV communication |
| **Parameters** | | **Configuration of data from ACV/DCV700** | |
| 41217 | 192 | DRREC(0) DS91 | BASIC Message Scan ms |
| 41218 | 193 | | IND1 Drive signal index Basic |
| 41219 | 194 | | IND2 Drive signal index Basic |
| 41220 | 195 | | IND3 Drive signal index Basic |
| 41221 | 196 | DRREC(1) DS2 | Normal Message1 Scan ms |
| 41222 | 197 | | IND1 Drive signal index Normal Cyclic data |
| 41223 | 198 | | IND2 Drive signal index Normal Cyclic data |
| 41224 | 199 | | IND3 Drive signal index Normal Cyclic data |
| 41225 | 200 | | IND4 Drive signal index Normal Cyclic data |
| 41226 | 201 | APC element DRREC(1) DS4 | Normal Message 2 Scan ms |
| 41227 | 202 | | IND5 Drive signal index Normal Cyclic data |
| 41228 | 203 | | IND6 Drive signal index Normal Cyclic data |
| 41229 | 204 | | IND7 Drive signal index Normal Cyclic data |
| 41230 | 205 | | IND8 Drive signal index Normal Cyclic data |
| 41231 | 206 | | IND9 Drive signal index Normal Cyclic data |
| 41232 | 207 | | IND10 Drive signal index Normal Cyclic data |
| 41233 | 208 | | IND11 Drive signal index Normal Cyclic data |
| 41234 | 209 | | IND12 Drive signal index Normal Cyclic data |
| | | **Configuration of data to ACV/DCV700** | |
| 41235 | 210 | DRTRA(0) DS90 | IND1 Drive signal index Basic |
| 41236 | 211 | | IND2 Drive signal index Basic |
| 41237 | 212 | | IND3 Drive signal index Basic |
| 41238 | 213 | DRTRA(1) DS1 | IND1 Drive signal index Normal Cyclic data |
| 41239 | 214 | | IND2 Drive signal index Normal Cyclic data |
| 41240 | 215 | | IND3 Drive signal index Normal Cyclic data |
| 41241 | 216 | | IND4 Drive signal index Normal Cyclic data |
| 41242 | 217 | APC element DRTRA(1) DS3 | IND5 Drive signal index Normal Cyclic data |
| 41243 | 218 | | IND6 Drive signal index Normal Cyclic data |
| 41244 | 219 | | IND7 Drive signal index Normal Cyclic data |
| 41245 | 220 | | IND8 Drive signal index Normal Cyclic data |
| 41246 | 221 | | IND9 Drive signal index Normal Cyclic data |
| 41247 | 222 | | IND10 Drive signal index Normal Cyclic data |
| 41248 | 223 | | IND11 Drive signal index Normal Cyclic data |

# Ethernet – Drive Link
# Profinet IO (Modbus TCP) to ACV700/DCV700

**ACV/DCV700 Node 4 Data from Drive to Ethernet**

| **Ethernet Data ←** | | **ACV/DCV700 Node 4 Data from Drive to Ethernet** | |
|---|---|---|---|
| Modbus / | Index | | |
| 40061 | 40 | DRREC(0) DS91 | Basic Data 1 |
| 40062 | 41 | | Basic Data 2 |
| 40063 | 42 | | Basic Data 3 |
| 40064 | 43 | DRREC(1) DS2 | Normal Cyclic Data 1 |
| 40065 | 44 | | Normal Cyclic Data 2 |
| 40066 | 45 | | Normal Cyclic Data 3 |
| 40067 | 46 | | Normal Cyclic Data 4 |
| 40068 | 47 | APC element DRTRA(1) DS4 | Normal Cyclic Data 5 |
| 40069 | 48 | | Normal Cyclic Data 6 |
| 40070 | 49 | | Normal Cyclic Data 7 |
| 40071 | 50 | | Normal Cyclic Data 8 |
| 40072 | 51 | | Normal Cyclic Data 9 |
| 40073 | 52 | | Normal Cyclic Data 10 |
| 40074 | 53 | | Normal Cyclic Data 11 |
| | | | |
| **Status information from PE1376B/PD converter** | | | |
| 40075 | 54 | CONNECTSTATUS ACV/DCV700 see description below | |
| 40076 | 55 | CON_STS see TC-LINK Protocol description | |
| 40077 | 56 | TC_STS see TC-LINK Protocol description | |
| 40078 | 57 | NRR_DS see TC-LINK Protocol description | |
| 40079 | 58 | NRT_DS see TC-LINK Protocol description | |
| 40080 | 59 | TIMEOUT counter Drive Link, Number of timeouts on drive link | |

**ACV/DCV700 Node Common parameter Data to PE1376PN**

| **Ethernet Data →** | | **PE1376PN** | |
|---|---|---|---|
| Modbus / | Index | | |
| 41105 | 80 | Interval | Drive Link poll interval 0= 2ms,1= 5ms, 2= 8ms |
| 41106 | 81 | WDOG-IN | Watchdog, 0=Not used, 1-255 used |

| **Ethernet Data ←** | | **PE1376PN** | |
|---|---|---|---|
| Modbus / | Index | | |
| 40081 | 80 | WDOG-OUT | PE1376PN write WDOG-IN value to this position |
| 40082 | 81 | TOCNT | Watchdog, 0=Not used, 1-255 used |

**Watch dog**

Watchdog can be used for supervision of the communication on Ethernet. The Ethernet scanner must change the WDOG-IN from 1-255 every 2-3 sec. If no change is detected within 5 s the Drive link cvommunication will be stopped. If Ethernet scanner set WDOG-IN to =0 then no watch dog function is active.
Then Ethernet scanners application program are not supervised.
The drive communication will stop if the Ethernet plug is disconnected.

**PARAMETERS 1-32**

If any of the 1-32 parameters is changed then PE1376PN must be restarted. (Recycle of power) or the CONTROL must be set to 0 and then 1.

**CONNECTSTATUS**

This 16 bit word show status for DriveLink communication.
Bit0 Get link status passed ok
Bit1 Open connection done
Bit2 Start cyclic done
Bit3 Basic DataSet is setup ok
Bit4 Cyclic1 DataSet setup ok
Bit5 Cyclic2 DataSet setup ok
Bit6 Used for internal propose
Bit7 All setup is ok

Use Bit7 with a short delay off to detect Communication OK

**Error handling**

When Ethernet communication failure then DriveLink communication for all 4 ACV700 nodes are stopped. The PE1376PN display will indicate 0 for the actual node.

DriveLink communication status can be read on CONNECTSTATUS.
If drive link communication fails then the Profibus communication will still be running.
The Application in EthernetMaster must check the CONNECTSTATUS and take acktion.

### 2.6 Parameter example for ACV700 drive

| Parameter | Param. value ACV700 | Description ACV700 |
|---|---|---|
| 1. Basic MSG scan ms | 20 | |
| 2. Basic 01 signal Index from Drive | 10405 | |
| 3. Basic 02 signal Index from Drive | 10503 | |
| 4. Basic 03 signal Index from Drive | 10504 | |
| 5. Normal MSG1 scan ms | 100 | |
| 6. Normal 01 signal Index from Drive | 10104 | |
| 7. Normal 02 signal Index from Drive | 10307 | |
| 8. Normal 03 signal Index from Drive | 11803 | |
| 9. Normal 04 signal Index from Drive | 10105 | |
| 10. Normal MSG2 scan ms | 200 | |
| 11. Normal 05 signal Index from Drive | 10803 | |
| 12. Normal 06 signal Index from Drive | 10407 | |
| 13. Normal 07 signal Index from Drive | 1324 | |
| 14. Normal 08 signal Index from Drive | 12206 | |
| 15. Normal 09 signal Index from Drive | 12207 | |
| 16. Normal 10 signal Index from Drive | 12208 | |
| 17. Normal 11 signal Index from Drive | 1802 | |
| 18. Normal 12 signal Index from Drive | 0 | |
| 19. Basic 01 signal Index to Drive | 10401 | |
| 20. Basic 02 signal Index to Drive | 10201 | |
| 21. Basic 03 signal Index to Drive | 10701 | |
| 22. Normal 01 signal Index to Drive | 10101 | |
| 23. Normal 02 signal Index to Drive | 10102 | |
| 24. Normal 03 signal Index to Drive | 12108 | |
| 25. Normal 04 signal Index to Drive | 0 | |
| 26. Normal 05 signal Index to Drive | 11201 | |
| 27. Normal 06 signal Index to Drive | 11202 | |
| 28. Normal 07 signal Index to Drive | 10501 | |
| 29. Normal 08 signal Index to Drive | 10502 | |
| 30. Normal 09 signal Index to Drive | 10801 | |
| 31. Normal 10 signal Index to Drive | 0 | |
| 32. Normal 11 signal Index to Drive | 401 | |
| | | |

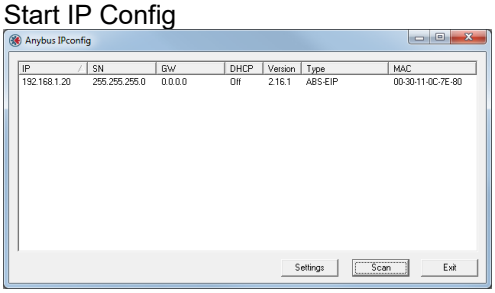
### 2.7 Parameter example for DCV700 drive

| Parameter | Param. value DCV700 | Description DCV700 |
|---|---|---|
| 1. Basic MSG scan ms | 20 | |
| 2. Basic 01 signal Index from Drive | 10311 | |
| 3. Basic 02 signal Index from Drive | 10405 | |
| 4. Basic 03 signal Index from Drive | 10706 | |
| 5. Normal MSG1 scan ms | 100 | |
| 6. Normal 01 signal Index from Drive | 10104 | |
| 7. Normal 02 signal Index from Drive | 10305 | |
| 8. Normal 03 signal Index from Drive | 11806 | |
| 9. Normal 04 signal Index from Drive | 11804 | |
| 10. Normal MSG2 scan ms | 200 | |
| 11. Normal 05 signal Index from Drive | 10409 | |
| 12. Normal 06 signal Index from Drive | 11811 | |
| 13. Normal 07 signal Index from Drive | 10503 | |
| 14. Normal 08 signal Index from Drive | 10504 | |
| 15. Normal 09 signal Index from Drive | 12210 | |
| 16. Normal 10 signal Index from Drive | 12211 | |
| 17. Normal 11 signal Index from Drive | 12212 | |
| 18. Normal 12 signal Index from Drive | 0 | |
| 19. Basic 01 signal Index to Drive | 10101 | |
| 20. Basic 02 signal Index to Drive | 10401 | |
| 21. Basic 03 signal Index to Drive | 10705 | |
| 22. Normal 01 signal Index to Drive | 10201 | |
| 23. Normal 02 signal Index to Drive | 10702 | |
| 24. Normal 03 signal Index to Drive | 10501 | |
| 25. Normal 04 signal Index to Drive | 10502 | |
| 26. Normal 05 signal Index to Drive | 10102 | |
| 27. Normal 06 signal Index to Drive | 408 | |
| 28. Normal 07 signal Index to Drive | 1201 | |
| 29. Normal 08 signal Index to Drive | 10803 | |
| 30. Normal 09 signal Index to Drive | 1313 | |
| 31. Normal 10 signal Index to Drive | 12108 | |
| 32. Normal 11 signal Index to Drive | 10501 | |
| | | |

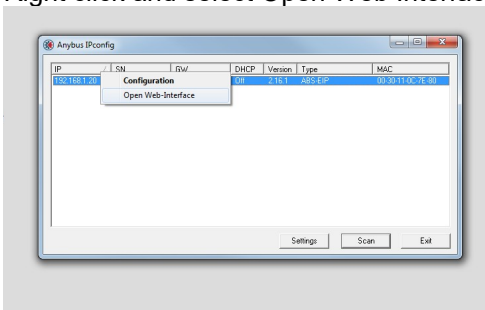
## 2.8 Setting IP address by Anybus IP config

Download and install the Anybus IP Config program from www.hms.se

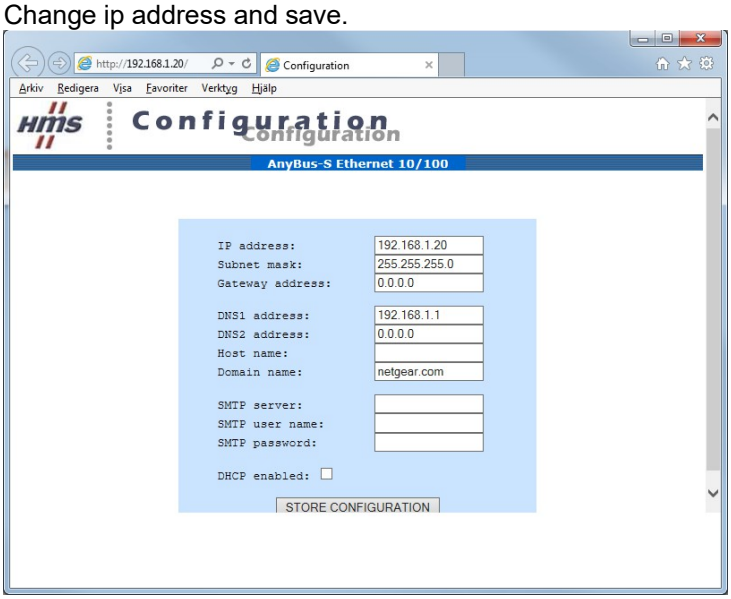
Start IP Config




Right click and select Open Web Interface




Change ip address and save.

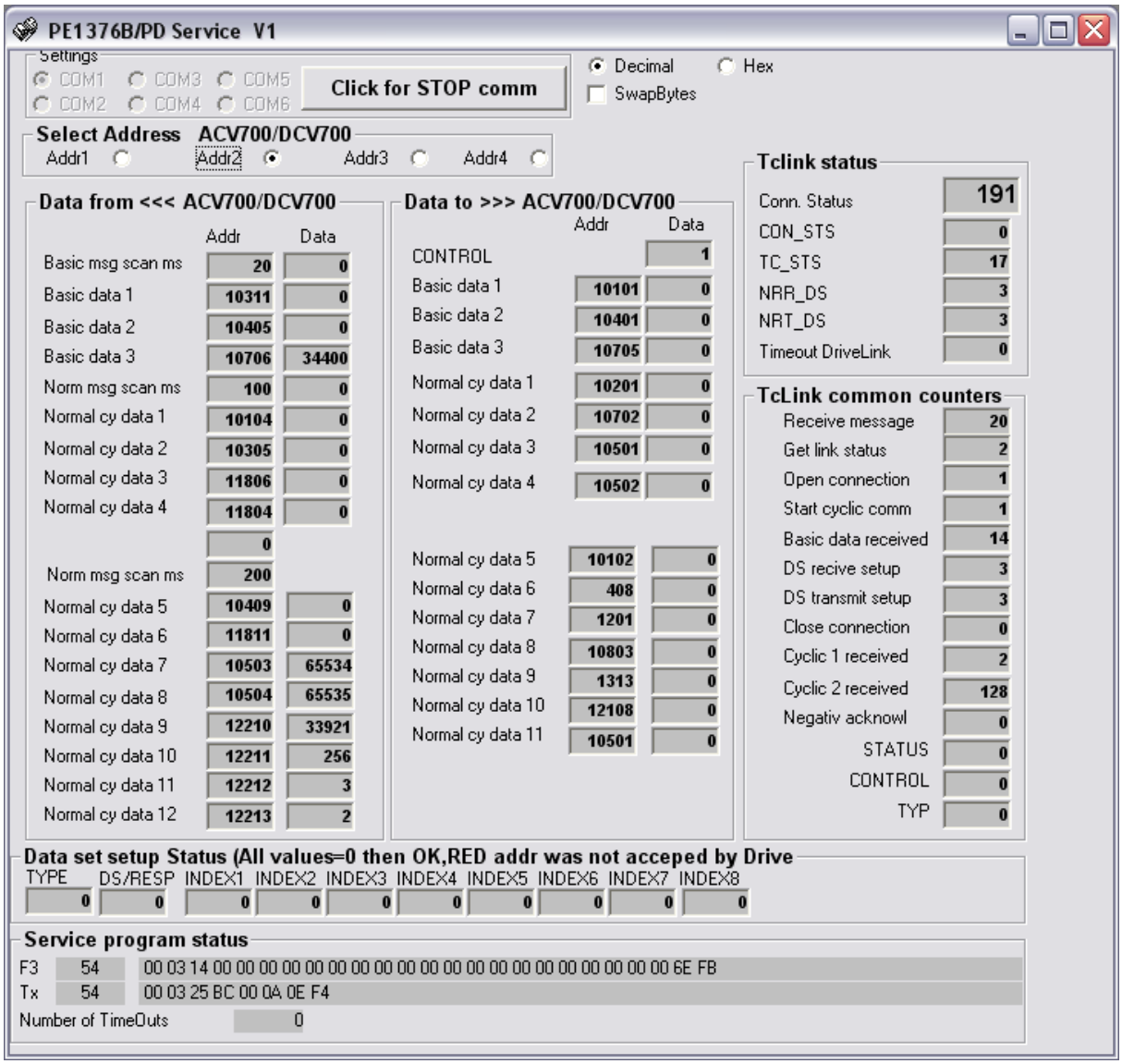


## 2.9 Service program for commissioning and fault tracing

Install the PE1376DP.MSI file on a PC with a Serial COM port.
Connect PC comx to PE1376B/PD Service RS232 port with a 9 pole DSUB standard modem cable (straight cable connection 1-2,2-2…..)
You will need to remove the cover of the PE1376PN

Start the program and Select COM port number and then Click on “Click for Start Comm.
Select the ACV/DCV700 nr1-4 you like to watch.
Set mouse pointer over the field you like to know more about.

This example shows values from/to Drive addr 2 (DCV700)



# 3. Startup guide

## 3.1 Define the APC addresses to read and write

Look in the APC application to find out the addresses used for data to and from the Drive ACV700 or DCV700.
Look in the Parameter example section to find out how it can look like.
All this parameters must be sent from the Ethernet scanner to PE1376PN for configuration of the communication. The parameter set up can be different between the 4 drives. If parameters are changed during operation the communication to actual drive must be stopped ( CONTROL set to 0) and then started again ( CONTROL set to 1). If wrong address (missing in APC ) is entered the communication will not start up ok.

## 3.2 Connect PE1376PN to the drives

If only one drive is used it is possible to connec the optical fibers direct from PE1376PN to the drive. Else the optical distributor YPC111A must be used.
Set the CONTROL to 1 from the Ethernet scanner.

## 3.3 Connect a PC com port to the service connector

For fault searching and test you can use the service program PE1376B/PD.
This service program is the same for PE1376PN and PE1376B/PD.
When comm to the drive is ok the status must be 191.

# 4. ControlLogix Communication example for PE1364C

## 4.1 General

Observe that tis description is not describing how connect PE1376PN but a lot of this will be useful information. Plese look at "**EtherNetIP_ adapter_RSLogix_2.03.pdf**" for morte information.

The communication to and from ControlLogix PLC's is accomplished using UCMM messages. On the PLC side this is programmed with MSG instructions. As mentioned earlier the communication is implemented using 6 different memory areas (attributes 1-6) for data and one area (attribute 7) for AC800M node status. The AC800M node numbers used are assumed to be using the first 24 nodes on either DriveBus (CI858) or Module Bus. Other node numbers can be selected using dip switches S1.1 through S1.3 on PE1364C.

The attached examples are made using RSLogix5000.

## 4.2 Memory usage

The AC800M arranges the communicated signals in maximum 24 nodes (drives) with each having 24 16-bit integers in either direction. This gives a maximum of 24 * 24 = 576 16-bit integers that can be transmitted and received in either direction.

In the PE1364C and in the ControlLogix PLC the signals are handled as 6 blocks or data (memory areas/attributes). Each memory area is read or written from/to the PE1364C using an MSG instruction and reads 192 bytes (96 Integers) into an array. Each memory area corresponds to 4 nodes on the AC800M side.

## 4.3 ControlLogix Programming

A part of a program example that reads and writes all 6 memory areas is shown below. The program also reads area 7 that contains 2 dint words that holds the status of each AC800 node as a bit. Since the AC800M side of the PE1364C uses a maximum of 24 nodes all data is present in the first word and the second word will always be 0.

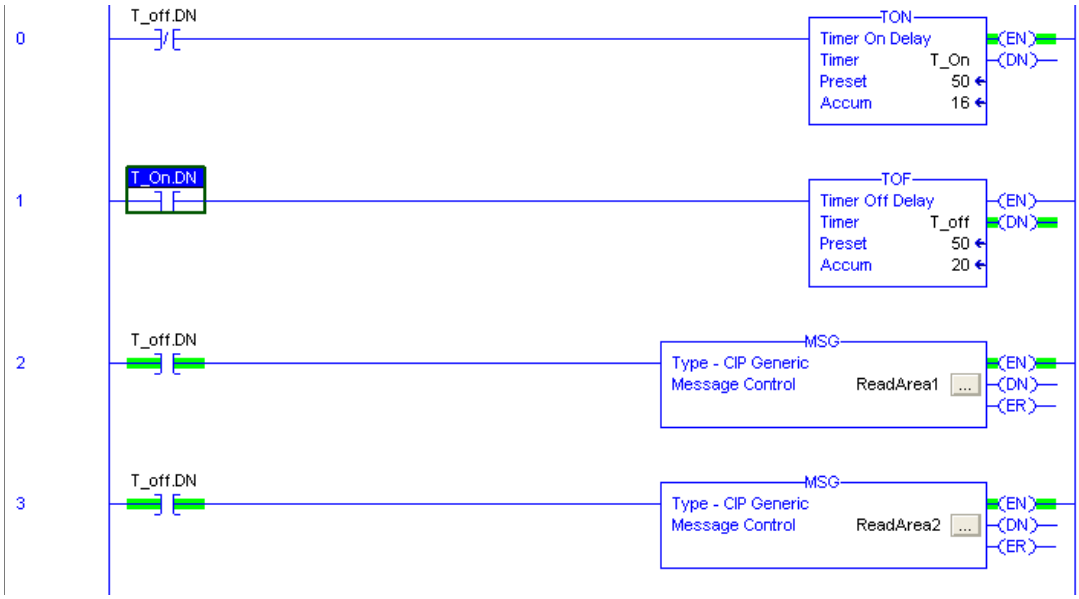



*Fig. 1 Start of ControlLogix program to read memory areas (attributes) 1 and 2. The TON/TOFF function blocks generate a pulse signal that activates the reading of the data every 100 ms.*

### 4.3.1 MSG (Message) Instruction

The message instruction is configured according to the example below. In the example the instruction is configured to read memory area 2 (attribute 2) from the PE1364C unit. Attribute 2 maps to AC800M nodes 5 through 8 if using DDCS on CI858 or nodes 105 through 108 if the optical module bus is used.

#### 4.3.1.1 Reading data from PE1364C

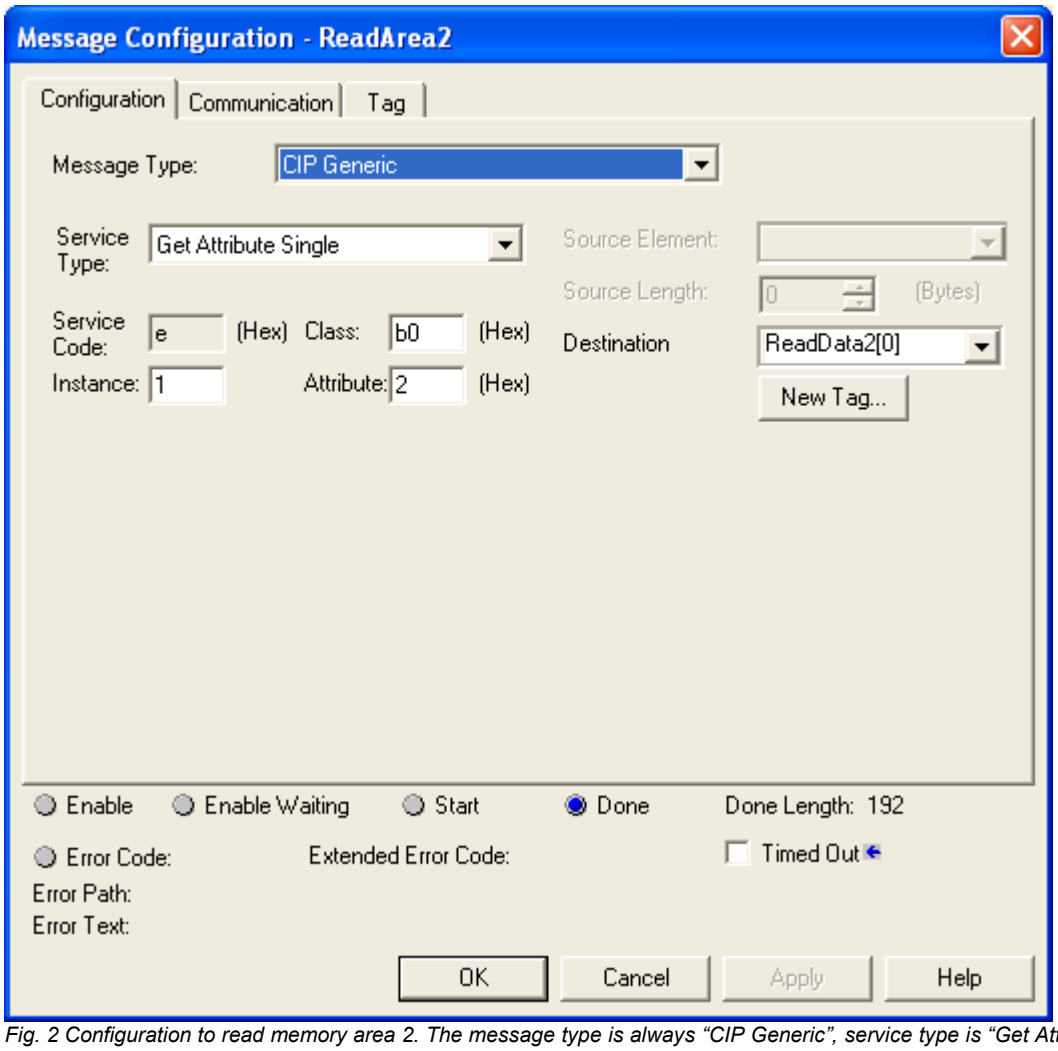



*Fig. 2 Configuration to read memory area 2. The message type is always "CIP Generic", service type is "Get Attribute Single". The class and Instance are always b0 and 1 to read data. The attribute number defines which memory are to be read. In this case memory area 2. The destination defines which tag the data should be read into. The tag should be an integer array of at least 96 words. The [0] after the tag name defines where in the array to start the data. In this case the data will be loaded starting a position 0 but it is possible to start at any position.*

From the above example we can also see the status of the read request. When the program is executing Enable, Start, Done and Done Length will change status. Done Length is the number bytes read in the request. In this case 192 bytes is equal to 96 integers or 4 nodes time 24 integers on the AC800M side.

The message instruction must also have the communication path defined. This is done on the second tab of the message instruction configuration. In the example below the communication path has been defined as ABB_Comms, 2, 192.168.0.20. ABB_Comms is the name given to the Ethernet/IP communication interface. The 2 instructs to system to go outside the card on the Ethernet/IP network and 192.168.0.20 is the IP address of the PE1364C.

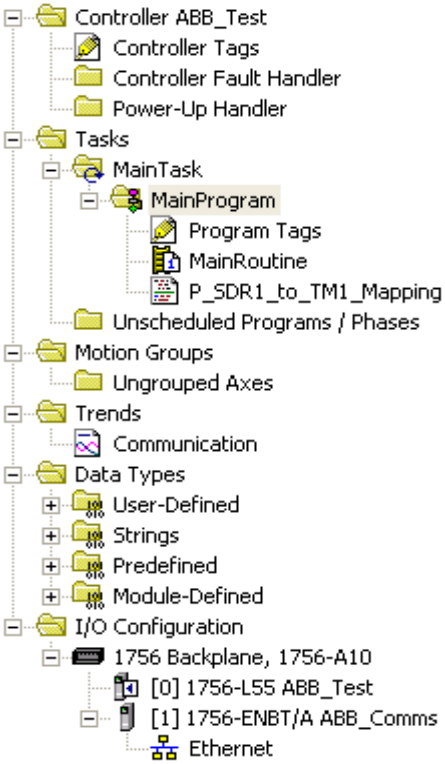



*Fig. 3 ControlLogix PLC. Ethernet/IP communication through 1756-ENBT/A ABB_Comms*

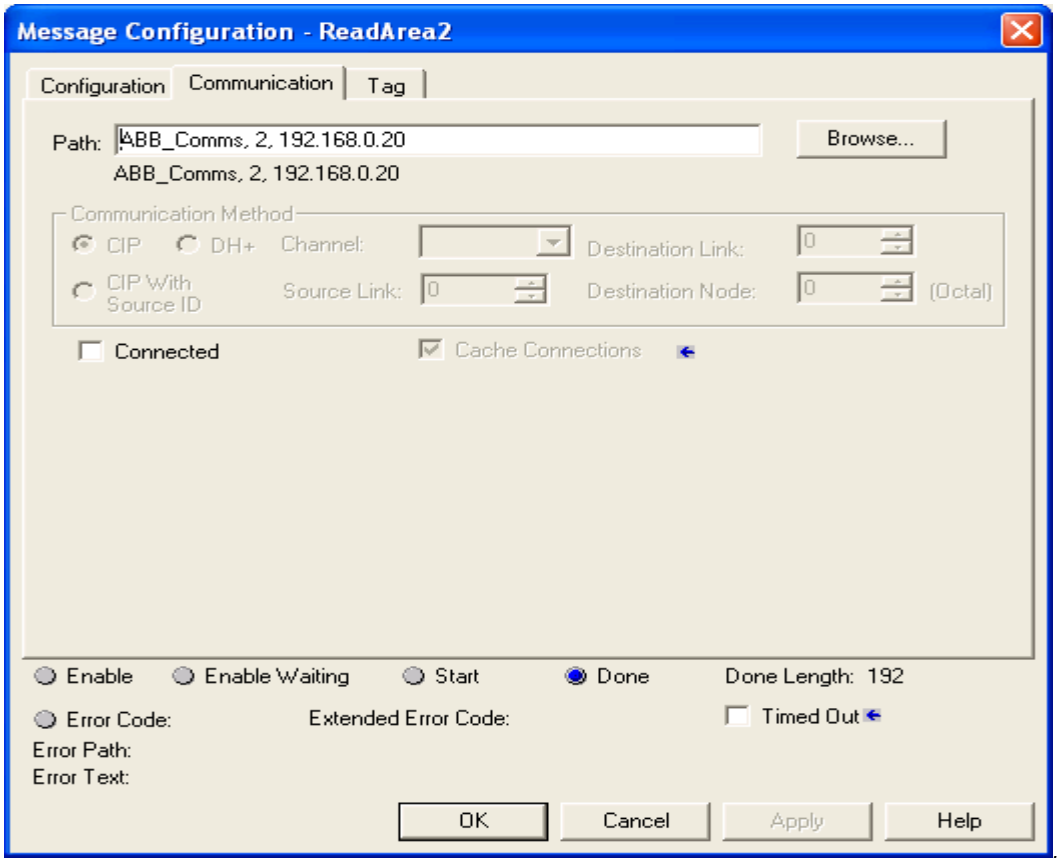



*Fig. 4 Communication path definition from the example shown above.*

### 4.3.1.2 Writing Data to PE1364C

Writing data to PE1364C is done in a similar way as reading data from the unit. The example below is configured to write into memory area (attribute) 2.

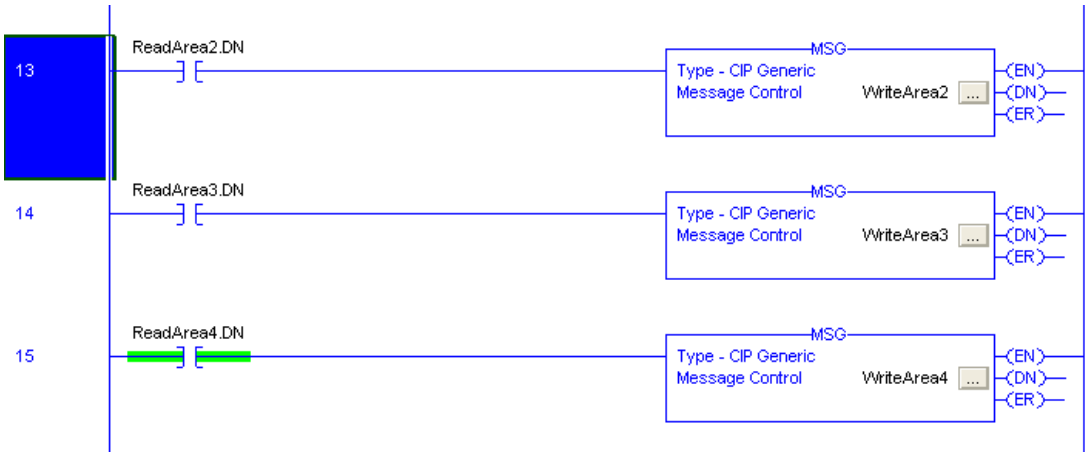



*Fig. 5 part of ControlLogix program writing to PE1364C. In the program the execution of the Message instruction has been tied to the done bit of the read instruction of the same memory are for testing purposes. It is however no necessary and the execution of the read and write messages can be controlled independently from each other.*

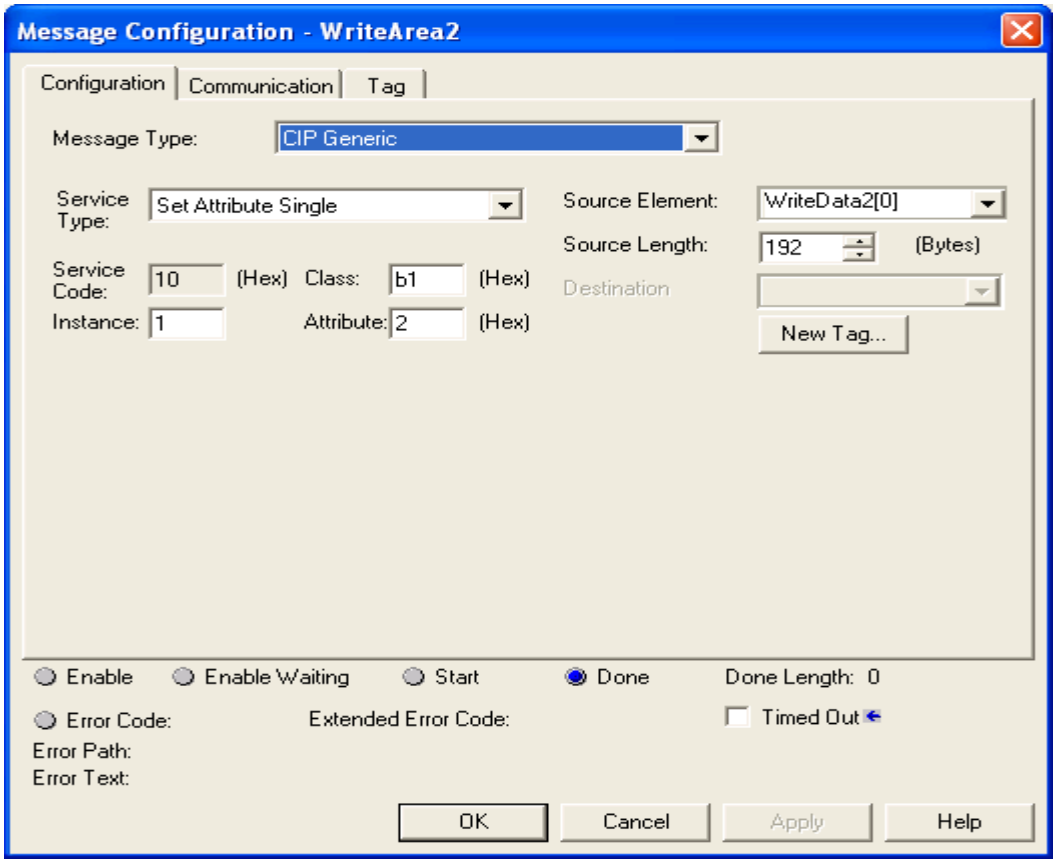



*Fig. 5 Configuration to write memory area 2. The message type is always "CIP Generic", service type is "Set Attribute Single". The class and Instance are always b1 and 1 to write data. The attribute number defines which memory that is to be written. In this case memory area 2. The source element defines which tag the data should be written from. The tag should be an integer array of at least 96 words. The [0] after the tag name defines where in the array to start the data. In this case the data will be loaded starting a position 0 but it is possible to start at any position. The source length defines how many bytes should be written. In this case we are writing 192 bytes or 96 integers.*

The communication path is defined in the same manner as when reading data.

### 4.3.1.3 Reading the AC800M communication node status

The communication between AC800M and PE1364C is based on up to 24 engineered drive nodes. This means that fro the AC800M PE1364C acts as 24 different engineered drives. The drives are normally added in groups of 4 matching one complete memory area. The status of each drive node communication can be read and monitored by the ControlLogix PLC. The status is available as a 4 16-bit integer words in memory area 7. Since PE1364C uses a maximum of 24 nodes it means that all 24 bits of the communication supervision fits inside one dint. For this reason it's more convenient to read the 4 16-bit words as 2 dints.

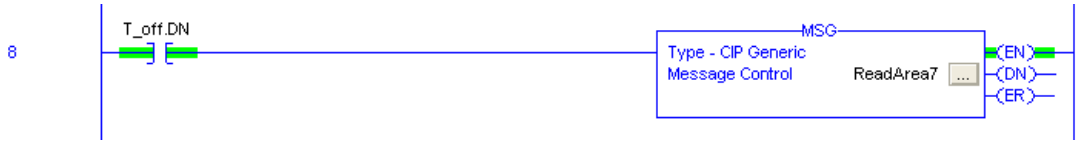



*Fig. 6 Reading the AC800M communication node status in ControlLogix.*

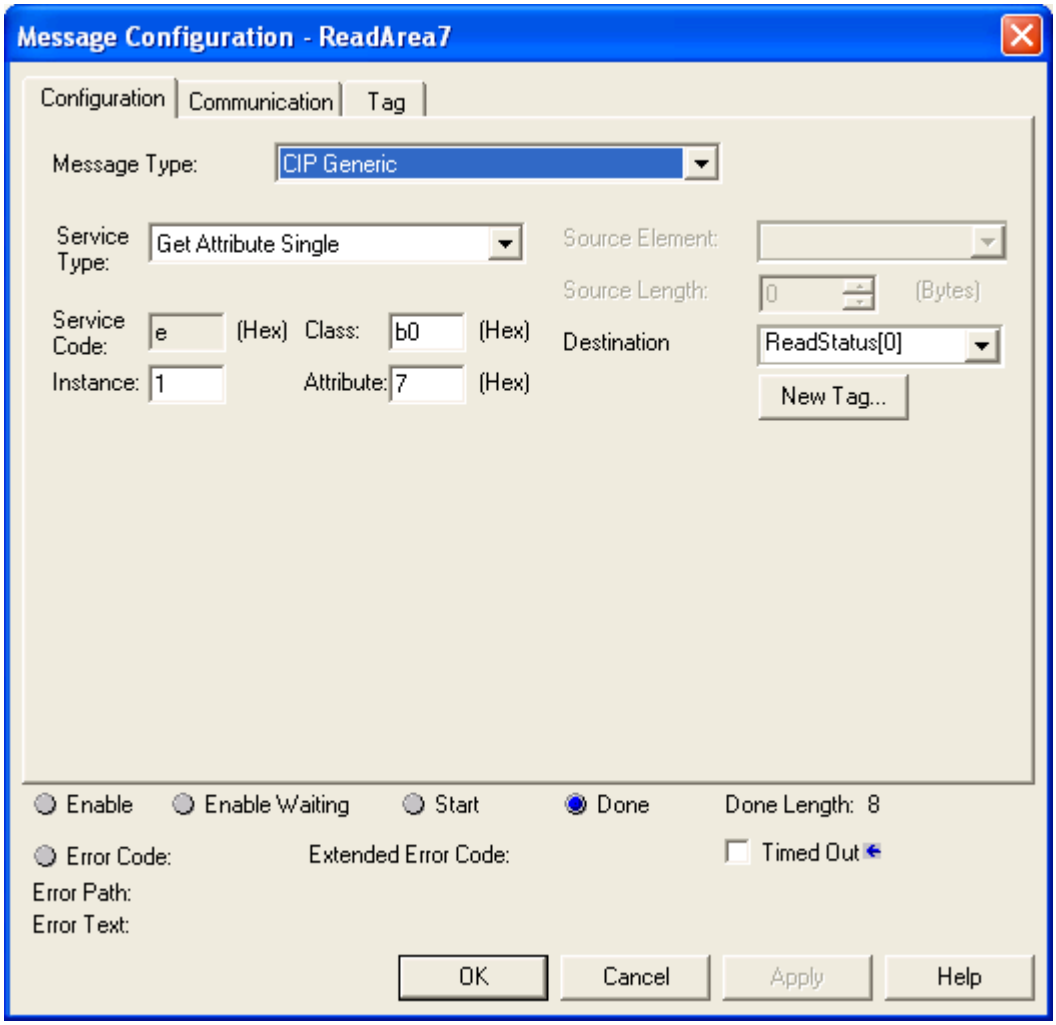



*Fig. 7 Configuration to read memory area 7 that contains the AC800M to PE1364C communication status. In this case the Done Length will only be 8 bytes.*

| | | | | | |
|---|---|---|---|---|---|
| ReadData6 | | | INT[96] | Decimal | |
| ReadStatus | | | DINT[2] | Decimal | |
| RealIn | | | REAL[48] | Float | |

*Fig. 8 Definition of the ReadStatus tag for the AC800M node communication status. Note that the tag is defined as a dint array with two positions.*

| | | |
|---|---|---|
| ReadData6 | {...} | Decimal |
| ReadStatus | {...} | Decimal |
| ReadStatus[0] | 2#0000_0000_1111_1111_1111_1111_1111_1111 | Binary |
| ReadStatus[1] | 0 | Decimal |

*Fig. 9 Actual values of the two variables in ReadStatus. Even though the tag is defined as a dint it's possible to view as a 32 bit packed Boolean. The first AC800M node 1(101) is the lowest bit in ReadStatus[0].*

## *4.4*

## *4.5 Floating point handling*

A floating point number can be written and read as two 16 bit integers. In the ControlLogix PLC this can be accomplished by using the COP or Copy instruction.

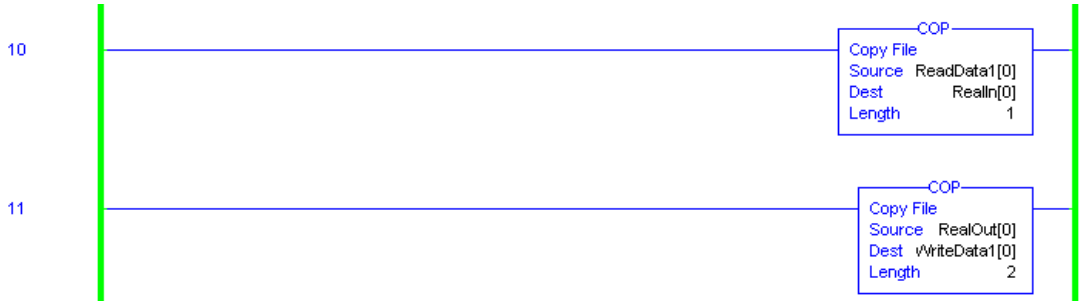



*Fig. 10 copying from and to floating point and integer values.*

The copy instruction on rung 10 above copies values starting at ReadData1[0] to the RealIn[0]. The length of the copied area is defined by the Length parameter. In this case one position Reallin is loaded from ReadData. Since ReadData is a 16-bit integer and a RealIn is a 32 bit floating point variable. Two consecutive values from ReadData1 are copied. The bit sequence has to be according to IEEE-754 floating point format with ReadData[0] holding the lower word and ReadData[1] holding the higher word.

The copy instruction on rung 11 works in the opposite direction by copying 1 floating point number from RealOut[0] to two 16-bit words in WriteData1[0]. The resulting 2 words are according to IEEE-754 floating point format with the low word in WriteData1[0] and the high word in WriteData1[1]. In this case the length which corresponds to the number of positions in the destination is 2 16-bit words.

## *4.6 Performance*

The communication has been tested with all memory areas written and read continuously. When all areas are written and read without any delays between the message blocks the 1756-ENBT/A communication board appears to limit the communication updates. This appears as longer than expected update time for the message requests.

If the message instructions are spaced in the program due the normal flow this does not appear to be a problem. In the test program the same results have been achieved by controlling the write request from the done request of the same memory area. With this solution update times of 100 ms can be sustained when sending and receiving the complete 576 16-bit integers.

With the number of variables reduced to one memory area (96 16-bit variables) consistent update times better than 50ms can been achieved.