

## 7.0 DATA MAPPING

This section provides loop and station data mapping for Modbus, Local Instrument Link, and Ethernet. Modbus is standard. LIL and Ethernet option boards are available and the correct board must be installed to enable either communication protocol. With the Ethernet option, data is accessed using Modbus commands embedded within the TCP protocol. This is becoming known within the industry as the Open Modbus/TCP Protocol.

The controller has an RS232 port that always communicates via Modbus. It is located on the underside of the operator faceplate.

Each controller also has a multi-drop network connection that is either Modbus, LIL (when the optional LIL board is installed), or Ethernet (when the optional Ethernet board is installed). The Ethernet connection is made using the standard RJ45 connector. The network can interconnect:

- Procidia i|pac, Moore 352*Plus*, Moore 353 and Moore 354N Controllers and a computer running i|ware PC™, ProcessSuite™, MYCROADVANTAGE™ or other operator interface software that includes the communication driver (e.g. Modbus, LIL (320), or OPC Ethernet) in the controller.
- Procidia i|pac, Moore 352*Plus*, Moore 353 and Moore 354N Controllers and an APACS® Model 39ACM Advanced Control Module via Modbus or LIL

The network permits data to be uploaded from the station to the computer or workstation. This data is typically used for process and alarm monitoring, additional processing of the data for inventory management and accounting, and process and equipment troubleshooting. Data can be downloaded to the station to change setpoint or valve value, change control mode, and acknowledge alarms.

Proprietary data transfers associated with configuration upload/download or on-line monitoring associated with the i|config Graphical Configuration Utility are not described. MPU Controller firmware versions are identified as explained in earlier sections.

### 7.1 CONNECTING TO APACS 39ACM, MYCROADVANTAGE, ProcessSuite, i|ware PC

#### 7.1.1 APACS

A Model 39ACM (Advanced Control Module) supports both Modbus and LIL connections. Use the standard Modbus Master Function Block Library to communicate with a station. When requesting Modbus data, do not exceed 48 coils or 60 registers per request. A LIL function block library (P/N 15939-625V4.00 ACM Serial Communication FB Library LIL) that provides a method for connecting the ACM to standard LIL stations is available. The library includes a Moore 352P/353/354 Loop block. The current release of the library maps the 352P/353/354 as having 3-loops located at channels 8, 13, and 18. Therefore, it is necessary to configure ODC function blocks for these channels. It is expected that later releases of the library will allow multiple loops, up to maximum allowed. Also, data from additional loops can be obtained by using a combination of other library functions such as LIL\_GBL, LIL\_NGBL, and LIL\_CMD.

#### 7.1.2 MYCROADVANTAGE

##### Model 320 Driver

MYCROADVANTAGE provides a LIL(320) driver that will communicate with stations on a Local Instrument Link (LIL). Standard, predefined parameter tables for many LIL products (e.g. Models 351 and 352) are within MYCROADVANTAGE to simplify configuration. MYCROADVANTAGE release 3.32 does not include a Model 352P/353/354 predefined parameter table. However, when up to three control loops are to be configured in a Model 352P, 353 or 354, use the Model 351 predefined parameter table and configure the ODC blocks in the loops to channels 8, 13, and 18. This method will work since the loop data in the controller is the same as a 351 and is located at the same relative offsets as in a 351. Loops can also be configured individually. Details on the configuration can be found the MYCROADVANTAGE user manual.

## Modbus Driver

MYCROADVANTAGE provides a Modbus driver for communicating with up to 32 stations through a single COM port. There are a few considerations when communicating with a Model 352P, 353 or 354 using the Modbus driver.

- Loop data is available as integer or floating point. When integer is used, more data is obtained with a single command, thus improving the communication throughput. When integer data is used, ranges can be scaled using 3:Linear function  $MX+B$  scaling.
- The MODBUS.DAT file must be modified. Under the section [Address Chunk Range], set “UseDefault=0”, under section [Address Size], set “itChunkSize=48” and “WordChunkSize=60”.

### 7.1.3 ProcessSuite

#### RealTime LIL I/O Server

An optional LIL RealTime I/O Server is available to communicate with the Model 320 ICI (Independent Computer Interface). The 320 communicates over the Local Instrument Link (LIL) with other stations that have the LIL option boards installed. Refer to the literature provided with the LIL RealTime I/O Server for proper operation. Optimize LIL performance by using Global Data, especially for data that is updated on each scan such as the process, setpoint, valve, loop status, and alarm I. Use individual parameter requests only to obtain data not required frequently (e.g. tuning parameters, range scaling).

#### Modbus I/O Server

A Modbus I/O Server comes with Process Suite and it can be used to communicate with the controller. Refer to the Modbus I/O Server instructions for operating details. Certain parameter settings are critical. In the Topic Definition, use the 584/984 slave type. Set the maximum coil reads to 48 and maximum register reads to 60. Maximum coil writes can be set to the minimum allowed value of 8 and register writes to 2.

### 7.1.4 i|ware PC

#### Modbus OPC Server

The i|ware PC Operator Interface software includes a Modbus OPC server that when connected to the controller can auto populate its database with the number and type of loops configured in the station. All tag names used in the OPC database will be the same as listed in this manual.

#### LIL OPC Server

The i|ware PC Operator Interface software includes an LIL OPC server that when connected to the controller can auto populate its database with the number and type of loops configured in the station. All tag names used in the LIL OPC database will be the same as listed in this manual.

#### Ethernet OPC Server

The i|ware PC Operator Interface software is an OPC Client and can be connected to an OPC server. An Ethernet OPC server using the Open Modbus/TCP Protocol is available to obtain data from single or multiple controllers and server the data to OPC clients.

**Modbus Application Note:** Refer to application document AD353-108 for information on using Modbus communications with controller products.