Universal Driver Software Tool

For Teledyne Isco D-Series Syringe Pumps

Overview

The Universal Driver from Teledyne Isco is a serial software driver that can translate commands for a variety of compilers. When you are creating programs for D Series syringe pumps, the driver converts serial commands to DASNET communications protocol, sends them to the serial port, and waits for a serial response.

> ☑ *Note*
>
> Basic LabView operation is described in detail in TB06 Basic Operation of LabView Toolkit.

Where to Find the Driver

A copy of the driver can be found on the CD included in the back of your D-Series pump user manual. It can also be downloaded from:

http://www.isco.com/products/ appnotes.asp?PL=105.

Open the Software Utilities folder and select Universal D-Series Pump driver to download the utility to a zip folder. Extract the sub folder named "Remote Pump."

Associated Files

This folder contains the following three files:

1. **Dasnet.dll** allows your serial commands to be entered into the compiler following DASNET protocol. Consult your compiler's documentation or manufacturer for specific information about utilizing the driver.

2. **Dasnet Functions.txt** provides the functions required for calling the driver.

   SendCommand is used prior to all serial commands, and contains the following instructions:

   ○ char *command
     opens the port and sends null terminated string
   ○ int pID
     refers to pump ID
   ○ int port
     refers to the COM port: 0 for port 1, 1 for port 2, etc.
   ○ int rate
     refers to baud rate
   ○ int time_limit
     = time out interval for port opening
   ○ char *reply
     = reply buffer (reply [190] for longest response string)

ClosePort terminates the connection to the instrument.

3. **RemotePump.exe** is an example of a simple program for controlling a syringe pump, created with an early version of a C compiler.
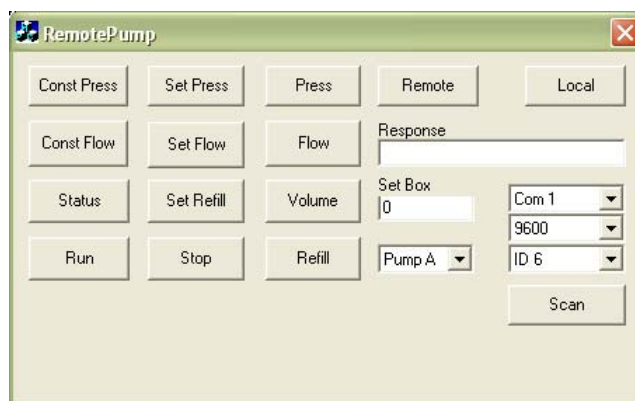

Figure 1: Example program RemotePump.exe

Serial Commands

A table of the serial commands recognized by Teledyne Isco syringe pumps is provided on the following pages.

Serial Commands

Table 1 is a list of the serial commands recognized by the pump. These commands are the message part of the DASNET protocol. The operand always follows the equals sign. Before any command that changes the operation of the pump can be accepted, the REMOTE command (listed in this table) must be sent once.

When setting a value, the command will always be followed by the equal (=) sign.

Table 1: Serial Commands

Command	Description
%B=#	Enter # for percentage of modifier.
ALOG1	Status of the analog voltage input on pin 21, P114. See NOTE 1.
ALOG2	Status of the analog voltage input on pin 15, P107 auxiliary DB25 connector and on analog input 3 of the accessory connector. See NOTE 1.
ALOG3	Status of the analog voltage input on analog input 2 of the accessory connector. See NOTE 1.
ALOG4	Status of the analog voltage on analog input 1 of the accessory connector. See NOTE 1.
ALOG5	Status of the analog voltage input on pin 2, P107 auxiliary DB25 connector. See NOTE 1.
CLEAR	Stops all motors, sets flow rate and pressure setpoints to zero.
CONTIN CONST FLOW	Puts pump in continuous flow under constant flow mode.
CONTIN CONST PRESS	Puts pump in continuous flow under constant pressure mode.
CONST FLOW CONST FLOWB CONST FLOWC	Put pump in constant flow mode.
CONST PRESS CONST PRESSB CONST PRESSC	Put pump in constant pressure mode.
DIGITAL	Returns the status (High or Low) of the digital outputs. Format is digital = xxxxxxxx, where "x" is either "H" or "L". The status order returned corresponds with the outputs 1—8.
DIGITAL = xxxxxxxx 1 ——— 8	Sets the digital output either High or Low, where "x" is either "H" or "L". The order corresponds with the outputs 1—8.

Table 1: Serial Commands (Continued)

Command	Description
DIG CONTROL	Returns the status of the digital output control bits as either REMOTE (R) or INTERNAL (I). The return message format is DIG CONTROL=xxxxxx, where "x" is either "R" or "I". "R" indicates the corresponding bit is controlled remotely; and "I" indicates the corresponding bit is controlled internally by pump software. The status order returned corresponds with the outputs 1—8.
DIG CONTROL = xxxxxxxx 1 ——— 8	Sets the digital output control bits to either internal or remote, where "x" is either "R" for REMOTE or "I" for INTERNAL CONTROL. "R" indicates the corresponding bit will be controlled remotely (through the serial port). "I" indicates the corresponding bit will be controlled internally by pump software. The order corresponds with the outputs 1—8.
FLOW	Returns the delivering pump's flow rate in continuous pumping mode and modifier addition mode. In INDEPENDENT mode it returns the pump A flow rate.
FLOWA FLOWB FLOWC	Returns the actual flow rate of the pump.
FLOW=# FLOWB=# FLOWC=#	Returns the actual flow rate of the pump Enter # for a flow rate setpoint (constant flow mode). Format is XXX.XXXXXXX ml/min. Only 5 figures are significant. Leading and trailing zeros are not required.
G G&	Gets pump information. "G" returns a text string that contains current pressure, analog input, and digital input information. "G&" is the Get All command. This returns the same information as "G," plus flow rates, units, operation status, and more. Refer to Section 6 of your manual for a complete description of this serial command.
IDENTIFY	Pump responds "SERIES=1240-0___, MODEL ____D PUMP; REV__." For each pump, REV__ is the internal pump program software revision. (For example, if the controller was attached to two 100DMs, the message would read "SERIES=1240-024, MODEL 100DM PUMP; SERIES=1240-024, MODEL 100DM; REV__.") The series number is the original catalog number for the pump type. It may not match the production series number on the pump serial label. SERIES=1240-024, MODEL 100DM PUMP SERIES=1240-027, MODEL 100DX PUMP SERIES=1240-021, MODEL 260D PUMP SERIES=1240-025, MODEL 500D PUMP SERIES=1240-052, MODEL 1000D PUMP SERIES=1240-063, MODEL 65D PUMP
INDEPENDENT	Put pumps in Independent mode.
IPUMPA=1, IPUMPA=0 IPUMPB=1, IPUMPB=0 IPUMPC=1, IPUMPC=0	Turns the pressure integral control On and Off for the pump indicated. 1 = ON 0 = OFF

Table 1: Serial Commands (Continued)

Command	Description
LGGO	Start Gradient Command. This starts a gradient program (same as the "RUN" key). This command will check to see if there is a gradient running and respond with "RUNNING" if there is.
LGSL,F:xx	Select Gradient File Command. This selects a gradient file to be run. This command will reset the controller to the saved file gradient type. If the selected gradient file does not exist, the controller will respond with "PROBLEM=INVALID OPERAND."
LGDL,F:xx,S:xx	Gradient Step Download command. This downloads a step from the pump to the PC. This command will respond with "PROBLEM=INVALID OPERAND" if the file or step does not exist. The controller will respond with step information if the command is valid. Refer to your manual for complete information on Gradient step download commands.
LGUL,F:xx,S:xx	Gradient Step Upload command. This transfers a step from the PC to the controller. Refer to your manual for complete information on Gradient step download commands.
LIMITS LIMITSB LIMITSC	Returns the pressure and flow rate limits.
LOCAL	Returns the instrument to local control. Front panel control is enabled and all motors are stopped (if control was previously remote).
MAXFLOWA=# MAXFLOWB=# MAXFLOWC=#	Enter # to designate the maximum flow rate setpoint.
MAXFLOWA MAXFLOWB MAXFLOWC	Returns the maximum flow rate setpoint.
MAXPRESSA=# MAXPRESSB=# MAXPRESSC=#	Enter # to designate the maximum pressure setpoint.
MAXPRESSA MAXPRESSB MAXPRESSC	Returns the maximum pressure setpoint.
MFLOWA=# MFLOWB=# MFLOWC=#	Enter # to designate the maximum flow limit in constant pressure mode.
MFLOWA MFLOWB MFLOWC	Returns the maximum flow limit setpoint.
MINFLOWA=# MINFLOWB=# MINFLOWC=#	Enter # to designate the minimum flow rate setpoint.
MINFLOWA MINFLOWB MINFLOWC	Returns the minimum flow rate setpoint.
MINPRESSA=# MINPRESSB=# MINPRESSC=#	Returns the minimum flow rate setpoint.

Command	Description
MINPRESSA MINPRESSB MINPRESSC	Returns the minimum pressure setpoint.
MODIFIER	Put pumps in modifier addition mode.
PRESS=# PRESSB=# PRESSC=#	Enter # to designate pressure setpoint (constant pressure mode).
PRESS	Returns the delivering pump pressure in continuous pumping mode and modifier addition mode. In INDEPENDENT mode it returns the pump A pressure.
PRESSA PRESSB PRESSC	Returns the actual pressure of the pump.
PRESSCNTRLDIFF1	Sets the pressure control input to Analog input 1, with a pressure range of 50 psi.
PRESSCNTRLDIFF1=XX XXX	Sets the pressure control input to Analog input 1 and sets the pressure range. The range is 1 to 5000. the units are psi, with a value of 5000 representing 5000 psi at 5 volts.
PRESSCNTRLDIFF2	Sets the pressure control input to Analog input 2, with a pressure range of 500 psi at 5 volts.
PRESSCNTRLDIFF3	Sets the pressure control input to Analog input 2, with a pressure range of 5000 psi at 5 volts.
PRESSCNTRLNORM	Sets the pressure control input to the standard input.
PRESSDIFF=XXXXX	Differential pressure setpoint. (PSI*10) 0 to 50,000 maximum (0 to 5000 psi)
PRESSDIFF	Reads the differential pressure value. (PSI*10) The transducer can also be read via the "ANGLx" serial commands.
RANGEA RANGEB RANGEC	Provides scaling information for the system parameters. See your manual for more information about this serial command.
RAPIDA RAPIDB RAPIDC	Activates the automatic rapid pressurization cycle (constant flow mode only).
REFILL REFILLB REFILLC	Move cylinder to bottom at preset refill rate.
REFILL=# REFILLB=# REFILLC=#	Enter # to designate refill rate.
REMOTE	Disables controller front panel control and enables all serial commands. Stops all motors (if control was previously local).
RLIMITA RLIMITB RLIMITC	Returns the refill flow rate limit.
RSVP RSVPB RSVPC	Pump responds with "READY" message.
RUN RUNB RUNC	Same as front panel. Initiates pumping.

Table 1: Serial Commands (Continued)

Command	Description
SETFLOWA SETFLOWB SETFLOWC	Returns the flow rate setpoint.
SETPRESSA SETPRESSB SETPRESSC	Returns the pressure setpoint.
STATUSA STATUSB STATUSC	Returns with status of pump. May be any combination of responses listed below. STATUS=STOPPROBLEM=OVER PRESSURE RUNUNDER PRESSURE REFILLCYLINDER FULL HOLDCYLINDER EMPTY EQUIL.MOTOR FAILURE LOCAL REMOTE EXTERNAL
STOP STOPB STOPC	Same as front panel, except that pump remains under remote serial control.
UNITSA=	Enter the desired flow or pressure units after the equal sign. Acceptable values are: ATM, BAR, KPA, PSI, ML/MIN, ML/HR, UL/MIN, UL/HR. (Sets all pumps.)
VOLA VOLB VOLC	Return the volume remaining in cylinder in ml. Format is "XXX.XXXX" ml.
VOLTOT	Returns the total volume delivered when using continuous flow or modifier.
VOL RESET	Will reset the volume total to zero.
ZEROA ZEROB ZEROC	"Zeros" the pressure sensor offset for analog input 1.
ZERODIFF1 ZERODIFF2 ZERODIFF3	"Zeros" the pressure sensor offset for the respective analog input.

NOTE 1: The analog input range is -1.5 to 11.6 volts. There is NO conversion of the returned number. The number returned (0 to 65535 decimal) will have an offset of 7500 added to the number (7500 = 0 volts) and a scale of 5000 for every 1 volt, for example:

$$\frac{number - 7500}{5000} = volts \qquad \frac{(32500 - 7500)}{5000} = 5\ volts$$

NOTE 2: The only pump B commands accepted in continuous pumping mode or modifier addition mode are: %B, FLOWB, LIMITSB, PRESSB, REFILLB, REFILLB=, STATUSB, VOLB.

| %B=# | Enter # for percentage of modifier. |

TELEDYNE ISCO
Everywhere**you**look™