SCC Inc.

Technical Instructions

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TS Series Application Guide



Description

The TS Series Application Guide includes programming, wiring, and operation examples of the control system for the most common applications.

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Remote Monitoring - Vijeo Design Air

Applies To: All TS Series

Introduction

Remote monitoring of a touchscreen is possible using an Android or iOS device (phone or tablet). The touchscreen display can be viewed or manipulated as if the user was at the actual touchscreen, in real time. To establish a connection, the phone or tablet must be connected to the same network as the touchscreen. This requires that the network for the touchscreen contain a wireless access point.

Procedure

<u>iOS</u>

To download the app, search for 'Vijeo Design Air' on the App Store.



Once downloaded, open the app.



Once open, navigate from 'Favorites' to 'Search' using the tabs at the bottom of the screen. The app will automatically search for available devices. Alternatively, touch 'Add Device' and the IP address of the desired touchscreen can be entered.



Touch the device to connect to. Acknowledge the warning shown if remote control is desired, then touch 'OK'. If view-only access is desired, touch 'View-only'.

Depending on the security design of this HMI	Depending on the security design of this HMI
Project, all touch objects might be accessible	Project, all touch objects might be accessible
for touch and input on this remote device.	for touch and input on this remote device.
Accidental touches can cause unintended	Accidental touches can cause unintended
operations to run in the system.	operations to run in the system.
UNINTENDED EQUIPMENT OPERATION	UNINTENDED EQUIPMENT OPERATION
 You must take all necessary steps to prevent	 You must take all necessary steps to prevent
accidental touches. Know and understand the hazards	accidental touches. Know and understand the hazards
surrounding equipment movement started by	surrounding equipment movement started by
remote operation. You must satisfy all gates	remote operation. You must satisfy all gates
and interlocks for protecting people and	and interlocks for protecting people and
equipment.	equipment.
Failure to follow these instructions can result	Failure to follow these instructions can result
in death, serious injury, or equipment	in death, serious injury, or equipment
damage.	damage.
I understand and accept responsibility regarding use of this functionality.	I understand and accept responsibility regarding use of this functionality.
Alternatively, you can continue in the View-	Alternatively, you can continue in the View-
only mode.	only mode.
OK View-only Cancel	OK View-only Cancel

Navigate to the 'Settings' tab to change settings. Note that when 'View-only' is selected, an icon appears on the top right corner of the screen. Selecting 'Keep awake while connected' will keep the screen lock from activating.

Settings		Settings	۲	£ v	ijeo Design'Air	8
TOUCH MANAGEMENT		TOUCH MANAGEMENT		Re	mote Servers	
Show touch	\bigcirc	Show touch	\bigcirc	Ċ Sear	ch Network	
Beep on touch	\bigcirc	Beep on touch	\bigcirc		TS_64S_KT	=
View-only	\bigcirc	View-only		U	192.168.1.60	0
POWER MANAGEMENT		POWER MANAGEMENT		Ð	TS_MS10S_U	
Keep awake while connected	\bigcirc	Keep awake while connected	\bigcirc			0
MISC.		MISC.				
Show status bar	\bigcirc	Show status bar	\bigcirc			
Favorites Search	Settings	Favorites Search	Settings	Favorites	Q	Ö Settings

The remote device is now connected. If remote control was enabled, touching the display will manipulate the touchscreen remotely, otherwise a message will appear stating that 'View-Only' mode was selected.



<u>Android</u>

To download the app, search for 'Vijeo Design Air' on the Google Play Store.



Once downloaded, open the app.



Once open, the app will automatically search for available devices. Alternatively, touch 'Add Device' and the IP address of the desired touchscreen can be entered.



Navigate to the gear icon to change settings. Note that when 'View-only' is selected, an icon appears on the top right corner of the screen. Selecting 'Keep awake while connected' will keep the screen lock from activating.



The remote device is now connected. If remote control was enabled, touching the display will manipulate the touchscreen remotely, otherwise a message will appear stating that 'View-Only' mode was selected.



Remote Monitoring - SCC Remote Viewer

Applies To: All TS Series (Software Version 17A1+)

Introduction

Remote monitoring of a touchscreen is possible using a Windows PC or tablet. The touchscreen display can be viewed or manipulated as if the user was at the actual touchscreen, in real time. To establish a connection, the PC or tablet must be connected to the same network as the touchscreen. This can be either wired or wireless.

Procedure

Connection

Once installed, double-click on the "SCC Remote Viewer" icon to open the application.



Once open, there is a drop-down menu listing all of the compatible TS Series screens.

💀 SCC Touchscreen Remote Viewer		_ _ x
Touchscreen Kit Boiler 1	-	Connect

Choose the desired touchscreen and then click **Connect**.

SCC Touchscreen Remote Viewer		
Touchscreen Kit Boiler 1	•	Connect
Touchscreen Kit Boiler 1 Touchscreen Kit Boiler 2 Touchscreen Kit Boiler 3 Touchscreen Kit Boiler 4 Touchscreen Kit Boiler 5 Touchscreen Kit Boiler 6 Touchscreen Kit Boiler 7 Touchscreen Kit Boiler 8		

Remote Monitoring - SCC Remote Viewer (continued)

If the chosen touchscreen is not connected to the network, the following message will appear:



If the touchscreen is not compatible with the viewer, the following message will appear:



If a connection to the touchscreen has already been made from another device, the following message will appear:



Remote Monitoring - SCC Remote Viewer (continued)

Once the connection has been established, the screen will appear in the actual pixel size. The display is limited to viewing only and will have display "VIEW-ONLY" in the title bar.



Remote Control

Remote control is possible by bringing up the right-click menu and clicking "View-Only".



Remote Monitoring - SCC Remote Viewer (continued)

This will bring up a warning about remote control that must be acknowledged. Once this is done, the mouse can be used to click on the screen with full control and title bar will no longer read "VIEW-ONLY".



Screen Captures

Images in .jpg, .bmp, .png or .tif format can be saved by right-clicking on the display and clicking "Save Screen Capture".



Zooming Display

The display can be zoomed from 100% to 300% in 25% increments by right-clicking on the display and clicking "Zoom". This will push out an additional menu which will allow the size to be selected.

🖳 B-1 Kit (5.7")				x
Save Screen Capture	(IE)	N	6	01:29
View-Only	BAT			
Zoom 🔸	~	1009	6	7.5%
GAS Ambient HOURS: 22		1259	6	
70"F		1509	6	∙lue 65∎F
VSD 69.3% Flame 100.0		1759	6	.ux-3
Output 48.4%		2009	6	
		2259	6	
Air		2509	6	°F
32.1 Fuel 44.7		2759	6	
MAIN MENU BOILER NOT AVAI		3009	6	

Multiple Connections

Connections can be established to multiple different TS Series screens simultaneously. Each screen can only be connected to one viewer at any time. Each display can be individually configured for remote control and viewing size as needed.

Other IP Addresses

Connection is possible with compatible TS Series screens by typing in the IP address directly. This is required when the IP address has been changed from the default.

💀 SCC Touchscreen Remote Viewer		
Other IP IP Address: 192.168.1.60	•	Connect

Loading Software Updates

Applies To: All TS Series

Introduction

Software updates can be easily applied using a USB drive (touchscreens) or an SD card (PLCs).

Procedure

If a software update is necessary, the files will be distributed by SCC in a ZIP folder. To load the contents to the device, the contents of the ZIP folder must be copied to the root directory of a USB drive or SD card.

TC	DUCHSCREEN				PLC		
	JOGGAA I		- X		B 212.0 41.		• X
🔆 🔾 マ 🚹 « Soft → TS_64S_KT.zi	p 🕨 👻 😽 Search	TS_64S_KT.zip	Q	Co v 🔥 « Softwar	e 🕨 kitSD.zip 🕨 👻 🐓 Se	earch kitSD.zip	۶
File Edit View Tools Help				Organize 👻 Extract a	ll files	8≡ ▼	
Organize Extract all files		8==	• 🔟 🔞	Name	Туре	Compressed size	Passw
Name	Date modified	Туре	Size	svs	File folder		
\mu FDATA		File folder		usr	File folder		
PUBLIC		File folder					
AGP.SYS	7/23/2015 9:09 AM	System file	1 KB				
BSP.OSC	7/23/2015 9:09 AM	OSC File	1,664 KB				
LDML.SYS	7/23/2015 9:09 AM	System file	1 KB				
MAIN.SYS	7/23/2015 9:09 AM	System file	2,099 KB				
SPLASH.JPG	7/23/2015 9:09 AM	JPEG Image	11 KB				
STUP.SYS	7/23/2015 9:09 AM	System file	1 KB				
S VERSION.SYS	7/23/2015 9:09 AM	System file	1 KB	4	III		
				2 items			

Organize 👻 Extract all files			8==	- 🔳 🕜
Name	Date n	nodified	Туре	Size
🔰 FDATA 🚽			File folder	
PUBLIC	Open		File folder	
AGP.SYS	Explore	:09 AM	System file	1
BSP.OSC	Cut	:09 AM	OSC File	1,664
S LDML.SYS	Copy	1:09 AM	System file	1
MAIN.SYS	copy	1:09 AM	System file	2,099
SPLASH.JPG	Delete	:09 AM	JPEG Image	11
STUP.SYS	Properties	:09 AM	System file	1
VERSION.SYS	1/23/2	015 9:09 AM	System file	1



FIOCEUU

Ensure that the USB drive or SD card is completely empty, then paste the contents.

TOUCHSCREEN

I`	OUCHDERLEIN	
🔾 😔 🗢 🖳 🕨 Computer 🕨	✓ 4y Search Com	puter 🔎
Organize - Eject Properties	System properties »	••• • 🔟 🔞
 Hard Disk Drives (1) 		
🏭 Windows7_OS (C:)		
Devices with Removable Storage	je (2)	
🔮 DVD RW Drive (D:)		
A Network Location (3)		
SCC Integration (\\scct620) (I:)	Pending Archive (\\scct620)	(P:)
▷ Other (1)		
VERBATIM (E:) Space used	Total	size: 7.45 GB
Removable Disk Space free	7.45 GB File syst	em: FAT32



Organize Comp... > VERBATIM (E) + Organize Share with New folder Image: Comp... > VERBATIM (E) Name Date modified This folder is empty.

			PLC			
		8-21				x
○ ¬ ■	Computer SE) (E:)	✓ 49 Searce	h SD (E:)	_	Q
Organize 🔻	Share with 🔻	New folder				0
Name			Date modified	Туре	Size	
		This fo	lder is empty.			
•						•
•	items					

TOUCHSCREEN

Organize 🕶 Shar	re with Vew folder		100 -	FIL	
Name	T Date modified	Туре		Size	
	View Sort by Group by Refresh Customize this folder				
	Paste Paste shortcut Undo Delete Ctrl+Z				
	Share with				



() ⊂ () ⊂	Computer 🕨 Sl	D (E:)	✓ 49 Search	h SD (E:)			<u>م</u>
Organize 💌	Share with 🔻	New folder					
Name		T <u>his fo</u>	Date modified Ider is emoty. View Sort by Group by Refresh Customize this fol	Type)	Size	
			Paste				
•			Paste shortcut Redo Delete	Ct	rl+Y		F
0 ite	ems		Share with New		•		

Check that the contents are as follows before proceeding. This should match the contents of the ZIP folder.

TOUCHSCREEN							PLC				
~~~					41.0	-	04114				X
🕒 🕘 🗢 📥 🕨 Com 🕨 VEF	RBATIM ( ) • • • Search	VERBATIM (E:)	Q	< <> <> <> <> <> <> <> <> <> <> <> <> <>	Computer      S	id (E:) 🕨	✓ 4 Search S	5D (E:)			
Organize      Share with	Burn New folder	8== •		Organize 🕶	Share with 🔻	Burn	New folder				(
Name	Date modified	Туре	Size		*		D	т		<i>C</i>	_
🗼 FDATA	7/23/2015 9:29 AM	File folder		Name			Date modified	туре		Size	•
PUBLIC	7/23/2015 9:29 AM	File folder		\rm 📗 sys			7/23/2015 11:11 AM	File folder			
AGP.SYS	7/23/2015 9:09 AM	System file	1 KB	usr			7/23/2015 11:11 AM	File folder	Ś		_
BSP.OSC	7/23/2015 9:09 AM	OSC File	1,664 KB								
LDML.SYS	7/23/2015 9:09 AM	System file	1 KB								
MAIN.SYS	7/23/2015 9:09 AM	System file	2,099 KB								
SPLASH.JPG	7/23/2015 9:09 AM	JPEG Image	11 KB								
STUP.SYS	7/23/2015 9:09 AM	System file	1 KB								
S VERSION.SYS	7/23/2015 9:09 AM	System file	1 KB								
	m			•			m				
9 items				2 i	tems						

#### Copying Files To Touchscreen

To copy the files into a touchscreen, insert the USB drive, then press **YES** when asked if you want to proceed with the installation.

Installing							
Do you want to install a new project from the USB drive?							
Warning: Back up your data. Runtime data files will be deleted during installation.							
Yes No							

When the installation is complete, remove the USB drive and press Restart.



The device will then reboot with the new software and the process is complete. If an activation is necessary, contact SCC with the activation code displayed and enter the key given to complete the activation process.

#### Copying Files To PLC

To copy the files into a PLC, first power the device off. Once it is powered off, insert the SD card. When the device is powered on, the 'SD' LED will flash as the device loads the software. When it is finished loading, the 'SD' LED will be a steady green and the 'ERR' LED will be flashing red. Eject the SD card and the PLC will reboot with the new software (no power cycle required).



If both PLC software and firmware are to be installed, the steps must be completed separately to load both. Each will be provided as a separate ZIP folder. Load any firmware first and software second.

The master or annunciator PLC may require activation when the updates are complete. An activation screen will automatically appear if necessary, otherwise activation is in place. If activation is required, contact SCC with the activation code displayed and enter the key given to complete the activation process.

If the PLC software is updated, it must be confirmed that the proper version of the software is running. There are multiple combinations of analog and RTD expansion modules possible and all of these versions of the software are loaded into the PLC. Applying the correct version can be done from the touchscreen. If the 'I/O' LED is illuminated, this indicates that the software version may be incorrect or the touchscreen is not connected.

#### Master PLC Activation

To access the menu for the annunciator PLC software first login using the user name SETUP. Then navigate to *Main Menu*  $\rightarrow$  *System Setup*  $\rightarrow$  *Master Activation*. Then press the title bar for > 1s to display the software menu.

07/23/15 SYSTEM SET	UP 🔂 12:20	07/23/15 SYSTEM SETUP 12:20
QTY: 1 Connection Method	EXPANDED ANNUNCIATION (ETHERNET ONLY):	QTY: 1 Connection EXPANDED ANNUNCIATION (ETHERNET ONLY): Setup
Select Load Controllers		Select Load Controllers Color / Shape MASTER ACTIVATED
SYSTEM TYPE: Hydronic		SYSTEM TYPE: CURRENT PROGRAM mst
	PUMP CONTROL: Disabled	CHANGE PROGRAM TO
DISPLAY UNITS: Standard		
TOTAL CAPACITY: OMBH	VSD: Not Connected	TOTAL CAPACITY: EXIT Not Connected
SYSTEM English AUTOMATIC LANGUAGE: Inglés LOGOUT: 10 min	AUTO CONFIG REMOTE: Yes	SYSTEM English MAC 00:01:23:39:AE:03 NFIG Yes
SCREEN SAVER TIME: 10 min SAVER TYPE: Status	OXYGEN: Dry	SCREEN SAVER TIME: 10 min SAVER TYPE: Status OXYGEN: Dry
Main Input/Output Custom Saved Menu Config Tags Images	Email Master Activation	Main         Input/Output         Custom         Saved         Email         Master           Menu         Config         Tags         Images         Email         Activation

The current version is displayed. Choose which version is desired, then press **APPLY (>1s)** for > 1s. The PLC will reboot with the correct software and the 'I/O' LED should not be illuminated.

These are the possibilities (must be installed in the order shown):

- mst: no additional options
- mstA: analog input module TM3AM6
- mstR: RTD input module TM3TI4
- mstAR: analog input module TM3AM6, RTD input module TM3TI4

#### Annunciator PLC Activation

To access the menu for the annunciator PLC software first login using the user name SETUP. Then navigate to *Main Menu*  $\rightarrow$  *Settings*  $\rightarrow$  *EA Base Config.* Then press the title bar for > 1s to display the software menu.

07/22/15	EKPANDED ANN, CONFIG	18:31	07/22/15	CURRENT	18:31
1: NOT USED	ALARM: None	RESET: Auto	1: NOT USED	kit	RESET: Auto
2: NOT USED	ALARM: None	RESET: Auto	2: NOT USED	CHANGE TO	RESET: Auto
3: NOT USED	ALARM: None	RESET: Auto	3: NOT USED	kit	RESET: Auto
4: NOT USED	ALARM: None	RESET: Auto	4: NOT USED		RESET: Auto
5: NOT USED	ALARM: None	RESET: Auto	5: NOT USED	APPLY (>1s)	RESET: Auto
6: NOT USED	ALARM: None	RESET: Auto	6: NOT USED		RESET: Auto
7: NOT USED	ALARM: None	RESET: Auto	7: NOT USED	EXIT	RESET: Auto
MAIN MENU			MAIN MENU		

The current version is displayed. Choose which version is desired, then press **APPLY (>1s)** for > 1s. The PLC will reboot with the correct software and the 'I/O' LED should not be illuminated.

These are the possibilities (must be installed in the order shown):

- **kit:** no additional options
- **kitA:** analog input module TM3AM6
- kitR: RTD input module TM3TI4
- **kitE**: economizer input module TM3TI4
- kitAR: analog input module TM3AM6, RTD input module TM3TI4
- **kitAE:** analog input module TM3AM6, economizer input module TM3TI4
- **kitRE:** RTD input module TM3TI4, economizer input module TM3TI4
- **kitARE:** analog input module TM3AM6, RTD input module TM3TI4, economizer input module TM3TI4

## **Additional Options Master**

Applies To: TS Series Lead/Lag Master

#### Introduction

Additional options exist in the lead/lag master that can be activated if needed. This can be done through the Modbus TCP/IP connection or through the TS Series Protocol Converter.

#### Procedure

The additional options are all activated from a single word, Modbus address 27. In Document No. TS-2100, this is labeled as 'LLM EXTRA OPTIONS'. Each option is represented as a bit. To write bits, take the sum of their decimal values (bit 0 = 1, bit 1 = 2, bit 2 = 4 and bit 3 = 8). For example, to write bits 0 and 2, the sum would be 5 and this would be written to Modbus address 27.

#### Disable Watchdog Timer

Bit = 0 (decimal value 1)

Normally, using a BMS connection to provide a remote enable or setpoint requires that the signal is refreshed on a regular interval. This is called a watchdog timer. If this is not done, the lead/lag master will revert to running on the local setpoint. This is known as 'fail to heat' mode. If the BMS system cannot work with the watchdog timer or if it is not otherwise desired, it can be disabled with this bit. If this is done, the GATEWAY/BMS screen on the lead/lag master will display 'EXTERNAL WATCHDOG DISABLED BY USER OPTION'. Note that if this action is taken, a loss of communication with the BMS will result in the last commanded option remaining in effect until a power cycle or until communication is re-established.

#### Outside Air Temperature From BMS

Bit = 1 (decimal value 2)

In a hydronic system if an outside air temperature sensor is connected it can be used to implement an outside air setpoint reset. Normally this sensor is connected to an analog or RTD input. If this bit is enabled, the system will take the outside air temperature from Modbus address 17. In Document No. TS-2100, this is labeled as 'LLM EXTRA INPUT'. The value written must be 120°F or less in order to be considered valid.

## Additional Options Master (continued)

#### **Direct Control Of Lead Boiler**

#### Bit = 2 (decimal value 4)

If this bit is set, the BMS can control the lead boiler selection by writing to Modbus address 3. In Document No. TS-2100, this is labeled as 'LLM LEAD BOILER'. This converts that address from read-only to read/write. The lead mode selected does not matter when direct BMS control is selected. When active, the LEAD SELECTION screen will display 'AUTOMATIC ALTERNATION CONTROLLED BY GATEWAY'. Note that if a boiler that isn't available is selected as lead this can cause system issues since the lead boiler will not be able to run. The total number of available boilers as well as individual boiler available statuses can be checked via Modbus.

#### Direct Control Of Load Demand

Bit = 3 (decimal value 8)

If this bit is set, the BMS can control the load demand directly by writing to Modbus address 26. In Document No. TS-2100, this is labeled as 'LLM LOAD DEMAND'. This converts that address from read-only to read/write. The modulation mode still applies for sequencing when direct BMS control is selected. When active, the SYSTEM OVERVIEW screen will display 'GATEWAY xxx% DEMAND'. The BMS demand is in the format of 0-100% and must be in this range to be valid. This will be translated into the percent of total demand, i.e. if there are three boilers for a total of 300%, a BMS demand of 50% will equal 150% for the purposes of lag start/stop points.

## Additional Options Master (continued)

#### Setting Options Via TS Series Protocol Converter

To apply these options to the TS Series Protocol Converter, enter the calculated word value for the desired options onto the web configuration page in the option labeled 'other_option'. After the value is entered, click 'Submit'. There will be a corresponding point for 'LLM EXTRA INPUT', 'LLM LEAD BOILER' and 'LLM LOAD DEMAND' to write the control data to.

SCC Inc. Universal Gatewa 🗴			Carlo – 🗆 🗙
← → C 🗋 192.168.1.	70/app/profiles/profiles.htm		☆ <b>=</b>
network_number	<b>BACnet Network Number</b> This sets the BACnet network number of the Gateway. <i>(1 - 65535)</i>	50 Submit	•
bac_cov_option	BACnet COV This enables or disables COVs for the BACnet connection. Use COV_Enable to enable. Use COV_Disable to disable. (COV_Enable/COV_Disable)	COV_Disable Submit	
bac_bbmd_option	BACnet/IP BBMD This enables BBMD on the BACnet/IP connection. Use BBMD to enable. Use - to disable. The bdt.ini files also needs to be downloaded. (BBMD/-)	- Submit	
watchdog_time	Watchdog Time Remote commands must be refreshed within this time. (0 - 999)	90 Submit	
other_option	Additional Option Codes Use as specified for additional options. (0 - 999)	0 Submit	
Active profiles			
Nr Node ID Curr Add	ent profile Parameters		
HELP (?) Netwo	rk Settings Clear Profiles and Restart System Res	tart	

## Lead/Lag Master DHW Priority

Applies To: TS Series Lead/Lag Master

#### Introduction

Domestic hot water (DHW) priority can be implemented using the W2 setpoint.

#### Procedure

Changing over to the W2 setpoint is accomplished via the 'W2 Setpoint' digital input. When activated, the W2 setpoint has priority over all other setpoint sources. The W2 setpoint is changed from the SETPOINTS screen on the Lead/Lag Master.

#### Using Digital Input From Thermostat

The easiest way to implement DHW priority is to connect a thermostat control directly to the 'W2 Setpoint' digital input. This is a low-voltage 24VDC connection.

## Lead/Lag Master DHW Priority (continued)

#### Using Analog or RTD Input

If one of the analog or RTD inputs is configured to monitor the temperature of the DHW tank, this can be used as a monitored digital output in order to activate the 'W2 Setpoint' digital input. See Document No. TS-2100 for additional detail on configuring analog, RTD and monitored digital outputs.

First, configure the analog or RTD input.

ANALOG INPUT 1								
NAME:	DHW :	Tank	R	ESET TAG				
UNIT: F		TYPE:	4-20mA	FILT	ER: 0			
MIN:	50	MAX:	250	TOTALS:	None			
LOW:	0	HIGH:	0	ALARM:	None			
Exit								

## Lead/Lag Master DHW Priority (continued)

Next, configure the monitored digital output to activate when the DHW tank temperature is below the desired DHW setpoint. This is shown under 'CONDITION 1'. The DHW tank temperature is connected to analog input 1, so that is the value to monitor. From the Modbus mapping, it is known that this value is represented x10, so it is necessary to apply a divider of 10. If the value is copied using the register lookup function, this will be done automatically. Since the action should be true when the monitored value is below the setpoint, choose < as the function.

'CONDITION 2' will not be used, so set the slider switch to **OFF**. Apply an off delay to provide a minimum run time to prevent short cycling of the input.

MONITOR OUTPUT 3 (DIGITAL)							
CONDITION 1							
MODBUS ADDRESS TO MONITOR: 13 / 10							
LLM ANALOG INPUT 1 U16							
WHEN SETPOINT 150.0							
OFF ON CONDITION 2 MODBUS ADDRESS TO MONITOR: 99 / 1							
UNUSED OR PARTIAL REGISTER							
WHEN = SETPOINT 999.0							
OUTPUT IS ACTIVE WHEN							
CONDITION 1 OR CONDITION 2							
APPLY DELAY OFF OF 300s							
OPTIONS: LATCH = NO ALARM = NO							
Exit							

## Lead/Lag Master DHW Priority (continued)

#### Wiring

Wire the monitored digital output to the 'W2 Setpoint' digital input to complete the process. Note that the terminals MVx-1 and MVx-2 refer to the specific monitored output used (i.e. monitored output 3 would use terminals MV3-1 and MV3-2).



## Lead/Lag Master Warm Weather Shutdown

Applies To: TS Series Lead/Lag Master

#### Introduction

Warm weather shutdown can be implemented using the 'Remote Disable' digital input or by using the 'W2 Setpoint' digital input.

#### Procedure

Using the 'Remote Disable' digital input requires that the system is in REMOTE mode. Putting the system in LOCAL mode will override the warm weather shutdown. This method can be used in conjunction with a BMS that is providing remote signals via the bus, or can be in parallel with another disable command if isolated by a relay.

Using the 'W2 Setpoint' digital input requires that a low W2 setpoint is entered so that the system will appear satisfied and no demand will be generated. When activated, the W2 setpoint has priority over all other setpoint sources. The W2 setpoint is changed from the SETPOINTS screen on the Lead/Lag Master.

One of the analog or RTD inputs must be configured to monitor the outside air temperature. This will then be used as a monitored digital output in order to activate the 'Remote Disable' or 'W2 Setpoint' digital input. See Document No. TS-2100 for additional detail on configuring analog, RTD and monitored digital outputs.

First, configure the analog or RTD input.

		ANA	LOG INI	PUT 1			
NAME:	NAME: OUTSIDE AIR				RESET TAG		
UNIT: F		TYPE:	4-20mA	FILT	ER: 0		
MIN:	0	MAX:	120	TOTALS:	None		
LOW:	0	HIGH:	0	ALARM:	None		
Exit							

## Lead/Lag Master Warm Weather Shutdown (continued)

Next, configure the monitored digital output to activate when the outside air temperature is above the desired warm weather shutdown setpoint. This is shown under 'CONDITION 1'. The outside air temperature is connected to analog input 1, so that is the value to monitor. From the Modbus mapping, it is known that this value is represented x10, so it is necessary to apply a divider of 10. If the value is copied using the register lookup function, this will be done automatically. Since the action should be true when the monitored value is above the setpoint, choose > as the function.

'CONDITION 2' will not be used, so set the slider switch to **OFF**. Apply an off delay to provide a minimum run time to prevent short cycling of the input.

MONITOR OUTPUT 3 (DIGITAL)							
CONDITION 1							
MODBUS ADDRESS TO MONITOR: 13 / 10							
LLM ANALOG INPUT 1 U16							
WHEN > SETPOINT 80.0							
OFF ON CONDITION 2 MODBUS ADDRESS TO MONITOR: 99 / 1							
UNUSED OR PARTIAL REGISTER							
WHEN = SETPOINT 999.0							
OUTPUT IS ACTIVE WHEN							
CONDITION 1 OR CONDITION 2							
APPLY DELAY OFF OF 300s							
OPTIONS: LATCH = NO ALARM = NO							
Exit							

## Lead/Lag Master Warm Weather Shutdown (continued)

#### Wiring

Wire the monitored digital output to the 'Remote Disable' or 'W2 Setpoint' digital input to complete the process. Note that the terminals MVx-1 and MVx-2 refer to the specific monitored output used (i.e. monitored output 3 would use terminals MV3-1 and MV3-2).



## _____

## Using Monitored Digital Outputs For Soft Limits

Applies To: TS Series Touchscreen Kit (With Annunciation Option)

#### Introduction

Monitored digital outputs can be configured to provide soft (non safety-related) limits.

#### Procedure

An example of a soft limit is a high flue temperature shutdown on the operating limits (control switch input).

Configure the monitored digital output to activate when the flue temperature is above the desired shutdown setpoint. This is shown under 'CONDITION 1'. The flue temperature is available from the LMV5 via Modbus. From the Modbus mapping, it is known that this value is represented without a divider, so a divider of 1 is entered. If the value is copied using the register lookup function, this will be done automatically. Since the action should be true when the monitored value is above the setpoint, choose > as the function.

'CONDITION 2' will not be used, so set the slider switch to **OFF**. Apply a short on delay to provide a filter time to verify a steady signal.

08/12/15	EXPANDED ANN. CONFIG	10:06	08/1	2/15 EX	PANDED ANN. CONF	IG 🚺	10:07		
DIG	ITAL OUTPUT / MONITORED VAL	JE 3	DIGITAL OUTPUT / MONITORED VALUE 3						
IF MODBUS AD		01	JTPUT IS ACTIVE WHE	N					
				CONDITION 1	AND	CONDITIO	N2		
	CONDITION 2			<u> </u>					
			APPLY	DELAY ON	OF 15s				
CONDITION N IS < S	NOT USED ETPOINT 0.0		OPTIO	NS: LATCH = ALARM =		NT = FA	LSE		
MAIN MENU			MAIN	MENU					

If desired, the action can be latched and/or create an alarm when true. Latching would require a manual reset via the ALARMS screen to clear the condition.

## Using Monitored Digital Outputs For Soft Limits (continued)

#### Wiring

Wire the monitored digital output into the control switch string in series with the existing limits to complete the process. Note that the terminals MVx-1 and MVx-2 refer to the specific monitored output used (i.e. monitored output 3 would use terminals MV3-1 and MV3-2).



## Using Monitored Digital Outputs For Time-Based Action

Applies To: TS Series Lead/Lag Master, TS Series Touchscreen Kit (With Annunciation Option)

#### Introduction

Monitored digital outputs can be configured to provide a time-based action such as a valve opening.

#### Procedure

An example of a time-based action could be a blowdown valve that opens once a day for 30 seconds. The time selected for this action will be 23:59.

Configure 'CONDITION 1' of the monitored digital output to activate when the hour is equal to '23'. The time and date data is available from the LMV5 via Modbus. From the Modbus mapping, it is known that this value is represented without a divider, so a divider of 1 is entered. If the value is copied using the register lookup function, this will be done automatically. Since the action should be true when the monitored value equals the setpoint, choose = as the function.

Activate 'CONDITION 2' by setting the slider switch to **ON**, then configure the monitored digital output to activate when the minute is equal to '59', following the above guidelines.

Choose **AND** as the logic applied between the conditions. Apply a 20 second on delay to keep the output inactive for the first 20 seconds of the condition being true. This is done since the action is only desired for 30 seconds instead of the full minute. Allow some extra time for communication of the data.

08/12/15 EXPANDED ANN. CONFIG 10:16	08/12/15 EXPANDED ANN. CONFIG 01:17		
DIGITAL OUTPUT / MONITORED VALUE 3	DIGITAL OUTPUT / MONITORED VALUE 3		
CONDITION 1 IF MODBUS ADDRESS 53 / 1 LMV HOUR			
IS = SETPOINT 23.0 OFF ON CONDITION 2 IF MODBUS ADDRESS 54 / 1	APPLY DELAY ON OF 20s		
IN SETPOINT 59.0	OPTIONS: LATCH = NO CURRENT = FALSE		
	MAIN MENU		

If desired, the action can be latched and/or create an alarm when true. Latching would require a manual reset via the ALARMS screen to clear the condition.

## Using Monitored Digital Outputs For Time-Based Action (continued)

#### Wiring

Wire the monitored digital output into the external action to complete the process. Note that the terminals MVx-1 and MVx-2 refer to the specific monitored output used (i.e. monitored output 3 would use terminals MV3-1 and MV3-2).

![](_page_33_Figure_5.jpeg)

## **Using Monitored Digital Outputs For Pump Control**

Applies To: TS Series Touchscreen Kit (With Annunciation Option)

#### Introduction

Monitored digital outputs can be configured to provide pump control for feedwater pumps or blend pumps based on the current LMV phase.

#### Procedure

An example could be a blend pump that needs to circulate when a boiler is operating, with an off delay to allow for extra circulation after the boiler shuts down.

Configure 'CONDITION 1' of the monitored digital output to activate when the phase is greater than or equal to '30' (prepurge begins). The phase data is available from the LMV5 via Modbus. From the Modbus mapping, it is known that this value is represented without a divider, so a divider of 1 is entered. If the value is copied using the register lookup function, this will be done automatically. Since the action should be true when the monitored value is greater than or equal to the setpoint, choose >= as the function.

Activate 'CONDITION 2' by setting the slider switch to **ON**, then configure the monitored digital output to activate when the phase is greater than '70' (afterburn begins), following the above guidelines.

Choose **AND** as the logic applied between the conditions. Apply a 120 second off delay to keep the output active for an additional 120 seconds.

08/12/15	EXPANDED ANN. CONFIG	10:38	08/12/15	EXPANDED ANN. CO	NFIG 0110:40
DIGITAL OUTPUT / MONITORED VALUE 3 DIGITAL OUT			ITAL OUTPUT / MONITOR	OUTPUT / MONITORED VALUE 3	
CONDITION 1					
IF MODBUS ADI	DRESS 0 / 1		OUTPUT IS ACTIVE WHEN		
LMV PHASE			CONDITIO	ON 1 AND	CONDITION 2
IS >= S	ETPOINT 30.0				
OFF 💽 C	IN CONDITION 2		APPLY DELA	AY OFF OF 120s	
IF MODBUS ADI	DRESS 0 / 1				
LMV PHASE			OPTIONS:	ATCH=NO CURF	ENT = FALSE
	SETPOINT 70.0 ALARM = NO				
					100 m
MAIN MENU			MAIN MENU		

If desired, the action can be latched and/or create an alarm when true. Latching would require a manual reset via the ALARMS screen to clear the condition.

## Using Monitored Digital Outputs For Pump Control (continued)

#### Wiring

Wire the monitored digital output into the pump start contact to complete the process. Note that the terminals MVx-1 and MVx-2 refer to the specific monitored output used (i.e. monitored output 3 would use terminals MV3-1 and MV3-2).

![](_page_35_Figure_4.jpeg)

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