

INSTALLATION & OPERATING INSTRUCTIONS

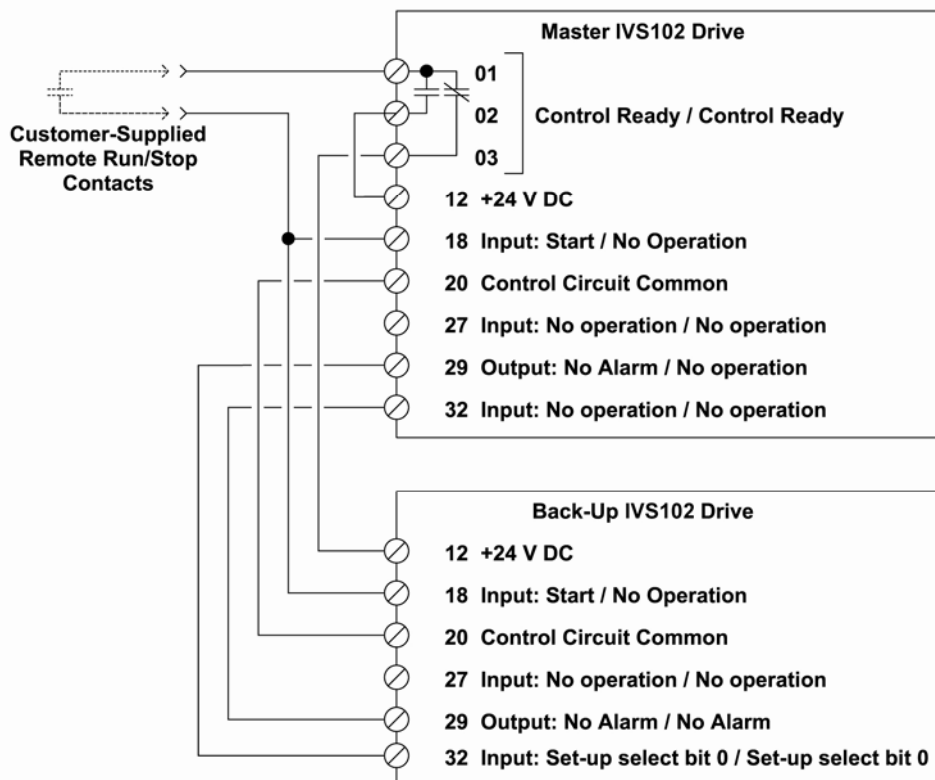
**Armstrong IVS - Duty/Standby Pumps
Alternation Setup Instructions**



To alternate Armstrong IVS pumping units based on elapsed time and to activate the standby unit should the duty pump fail.


General Data

1. Two identical drives are used; one integrated on each pump. Although one is designated as the "Master" Drive and the other as the "Back-Up" Drive, both take part equally in the alternation.
2. The designation "Master" Drive simply indicates that this is the drive that is controlling the alternation process.
3. The system provides complete redundancy. If one drive goes into an alarm condition, the other will automatically take over operation. Alternation attempts will cease until both drives are ready to operate.
4. For simplicity, this system requires only one set of "dry" external Run/Stop contacts. +24 V DC control voltage from both drives is provided to the Master Drive's Relay 1. If the Master Drive's control circuitry is working, its power supply will be used. If the Master Drive cannot provide control voltage, the Back-Up drive will automatically take over.
5. On the attached drawing (KF0042), the external interlock is disabled. To enable this, edit the value of parameter 5-12, Terminal 27 Digital Input, as required and wire the interlock.
6. No speed control is shown. This circuit works equally well for any speed control method desired: open loop, closed loop, or Sensorless.
7. No external monitoring is shown. All of this can be accomplished normally, with the exception that Relay 1 on the Master Drive is used by this circuit.
8. Pump alternation is controlled by the active setup of each drive. This is directly controlled by the Master Drive.
 - a) Under normal conditions, the State Controller of the Master Drive's Smart Logic Controller will run its program and change the active setup of the Master Drive based on the time delay set in Timer 0 by parameter 13-20.0.
 - b) When the Master Drive is operating normally in Setup 1, its Digital Output 29 will be high. This will put the Back-Up Drive into Setup 2.
 - c) When the Master Drive is operating normally in Setup 2, its Digital Output 29 will be low. This will put the Back-Up Drive into Setup 1.
 - d) If the Master Drive is in an alarm condition or if it loses power, its Digital Output 29 will be low. This will put the Back-Up drive into Setup 1, allowing it to take over operation.
 - e) If the Back-Up Drive is in an alarm condition or if it loses power, its Digital Output 20 will be low. This will cause the Master Drive to exit the program that is running in its State Controller. This will put the Master Drive into Setup 1, allowing it to take over operation.
9. While drive alternation is generally controlled by the Timer 0, as set in parameter 13-20.0, during system start-up and other situations, there may be a desire to force the alternation.
 - a) Logic Rule 1 provides the ability to address such a situation. This allows the user to over-ride the timer by pressing the [OK] and [>] keys on the keypad (Local Control Panel) at the same time.
 - b) Timer 1 provides an "anti-bounce" action for this key press combination. Once this pair of keys is pressed, the drive won't recognize that combination again until the 2 second timer has expired.



Notes

- Setup 1 is used for the Active drive.
- Setup 2 is used for the Standby drive.
- The "r" in the terminal descriptions above indicates how the terminal is programmed in Setup 1 and Setup 2. The functions are indicated like this: Setup 1 / Setup 2.
- See the attached documentation for parameter values and descriptions.

DRAWING NUMBER: KF0042		
DRAWN BY: KF		
TITLE: IVS102 Controls Two-Drive Pump Alternation Based on Elapsed Time		
DATE: March 21, 2009	REV.: DR: JMarch 21, 2009	SHEET 1 OF 1 SHEET
SCALE: NONE		

Master Drive Parameters

Parameter Number	Parameter Name	Parameter Value		Comments
		Setup 1	Setup 2	
0-01	Language	[0] English	[0] English	Messages on the display use International English.
0-03	Regional Setting	[0] International	[0] International	Sets various parameters to International default values.
0-10	Active Set-u	[9] Multi setup	[9] Multi setup	Allows the Active Set-up on the drive to be changed on command.
0-11	Programming Set-u	[9] Active Set-up	[9] Active Set-up	If the keypad is used to edit the drive's parameters, the parameters edited will be those in the Set-up that is presently active.
0-12	This Set-up Linked t	[0] Not linked	[1] Set-up 1	Allows the drive to switch between Set-ups while running.
5-02	Terminal 29 Mod	[1] Output	[1] Output	Sets up Terminal to provide an output to the other drive.
5-10	Terminal 18 Digital Inpu	[8] Start	[0] No operation	Allows the drive to run in Set-up 1, but not in Set-up 2.
5-12	Terminal 27 Digital Inpu	[0] No operation	[0] No operation	If no external interlock is needed, this eliminates the need to wire a jumper between Terminals 12 and 27.
5-14	Terminal 32 Digital Inpu	[0] No operation	[0] No operation	Although this is programmed for "No operation", this digital input is used by the Master Drive to determine if the Back-Up drive can run.
5-31	Terminal 29 Digital Outpu	[160] No alar	[0] No operation	When this Digital Output is high, the Back-Up Drive will be in Set-up 1. If the Master Drive is in an alarm condition or in Set-up 2, the Back-Up Drive will be in Set-up 1.
5-40.0	Function Relay	[1] Control ready	[1] Control ready	When the Master Drive's control is operational, its +24 V DC power supply is used to provide the Run command to both drives.
State Controller Start and Stop Events				
13-00	SL Controller Mode	[1] On	[1] On	Allows the State Controller to operate.
13-01	Start Event	[37] Digital input DI32	[37] Digital input DI32	When the Back-Up drive can run (as indicated by DI32 being high), the State Controller will run.
13-02	Stop Event	[26] Logic rule 0	[26] Logic rule 0	When the Back-Up drive can't run (as indicated by DI32 being low), the State Controller will stop and exit.
13-20.0	SL Controller Timer	023:59:58.000	023:59:58.000	The timer sets the time between automatic alternations.
13-20.1	SL Controller Timer	000:00:02.000	000:00:02.000	This is an "anti-bounce" timer to keep pressing the [OK] and [>] arrows from causing multiple actions.

Master Drive Parameters

Parameter Number	Parameter Name	Parameter Value		Comments
		Setup	Setup 2	
Logic Rule 0				
13-40.0	Logic Rule Boolean	[37] Digital input DI32	[37] Digital input DI32	This output is high when the Back-Up Drive is not able to operate.
13-41.0	Logic Rule Operator 1	[5] NOT AND	[5] NOT AND	
13-42.0	Logic Rule Boolean 2	[1] TRUE	[1] TRUE	
Logic Rule 1				
13-40.1	Logic Rule Boolean 1	[43] OK Key	[43] OK Key	This is used to alternate drives. This can either happen after Timer 0 expires or by pressing the [OK] and the [>] at the same time.
13-41.1	Logic Rule Operator 1	[1] AND	[1] AND	
13-42.1	Logic Rule Boolean 2	[46] Right Key	[46] Right Key	
13-43.1	Logic Rule Operator 2	[2] OR	[2] OR	
13-44.1	Logic Rule Boolean 3	[30] SL Time-out 0	[30] SL Time-out 0	
State 1				
13-51.0	SL Controller Event	[1] TRUE	[1] TRUE	This anti-bounce timer keeps the pressed keys from quickly repeating.
13-52.0	SL Controller Action	[30] Start timer 1	[30] Start timer 1	
State 2				
13-51.1	SL Controller Event	[31] SL Time-out 1	[31] SL Time-out 1	After the "anti-bounce" timer expires, the main alternation timer starts. The example here shows a 24-hour alternation time.
13-52.1	SL Controller Action	[29] Start timer 0	[29] Start timer 0	
State 3				
13-51.2	SL Controller Event	[27] Logic rule 1	[27] Logic rule 1	If Timer 0 expires or the [OK] and [>] keys are pressed, the Master Drive will switch to Set-up 2.
13-52.2	SL Controller Action	[3] Select set-up 2	[3] Select set-up 2	
State 4				
13-51.3	SL Controller Event	[1] TRUE	[1] TRUE	This anti-bounce timer keeps the pressed keys from quickly repeating.
13-52.3	SL Controller Action	[30] Start timer 1	[30] Start timer 1	
State 5				
13-51.4	SL Controller Event	[31] SL Time-out 1	[31] SL Time-out 1	After the "anti-bounce" timer expires, the main alternation timer starts. The example here shows a 24-hour alternation time.
13-52.4	SL Controller Action	[29] Start timer 0	[29] Start timer 0	
State 6				
13-51.5	SL Controller Event	[27] Logic rule 1	[27] Logic rule 1	If Timer 0 expires or the [OK] and [>] keys are pressed, the Master Drive will switch to Set-up 1.
13-52.5	SL Controller Action	[2] Select set-up 1	[2] Select set-up 1	

Back-Up Drive Parameters

Parameter Number	Parameter Name	Parameter Value		Comments
		Setup 1	Setup 2	
0-01	Language	[0] English	[0] English	Messages on the display use International English.
0-03	Regional Settings	[0] International	[0] International	Sets various parameters to International default values.
0-10	Active Set-up	[9] Multi setup	[9] Multi setup	Allows the Active Set-up on the drive to be changed on command.
0-11	Programming Set-up	[9] Active Set-up	[9] Active Set-up	If the keypad is used to edit the drive's parameters, the parameters edited will be those in the Set-up that is presently active.
0-12	This Set-up Linked to	[0] Not linked	[1] Set-up 1	Allows the drive to switch between Set-ups while running.
5-02	Terminal 29 Mode	[1] Output	[1] Output	Sets up Terminal to provide an output to the other drive.
5-10	Terminal 18 Digital Input	[8] Start	[0] No operation	Allows the drive to run in Set-up 1, but not in Set-up 2.
5-12	Terminal 27 Digital Input	[0] No operation	[0] No operation	If no external interlock is needed, this eliminates the need to wire a jumper between Terminals 12 and 27.
5-14	Terminal 32 Digital Input	[23] Set-up select bit 0	[23] Set-up select bit 0	Used by the Master Drive to control the Active Set-up of the Back-Up Drive.
5-31	Terminal 29 Digital Output	[160] No alarm	[160] No alarm	When this output is high, the Back-Up Drive can run, so the State Controller of the Master Drive will run to control the alternation of the drives.

Armstrong Holden Brooke Pullen Ltd.
Wenlock Way
Manchester
United Kingdom, M12 5JL
T: +44 (0) 1612 232223
F: +44 (0) 1612 209660
E: salesuk@armlink.com

Sales & Service Office
21 Ormside Way
Holmethorpe Industrial Estate
Redhill, Surrey, RH1 2NT
T: +44 (0) 173 737 8100
F: +44 (0) 173 737 8140
E: salesuk@armlink.com

S. A. Armstrong Limited
23 Bertrand Avenue
Toronto, Ontario
Canada, M1L 2P3
T: (416) 755-2291
F (Main): (416) 759-9101
E: info@armlink.com



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