## Purpose

The purpose of this document is to assist in the setup of the ACH550 variable speed drive for PID operation. Reference ACH550-UH HVAC User's Manual (1…550HP).

## Instruction

**PID Direction Setup**. If not sure, ask the caller "As the output of the sensor goes up, what is the drive speed supposed to do: speed up or slow down?" If "slow down", para. 4005 is "no". If "speed up", para. 4005 is "yes".

| MODE | Process Value / Feedback | DRIVE SPEED | Para. 4005 |
|---|---|---|---|
| Duct Pressure | UP | DOWN | NO |
| Pipe Pressure | UP | DOWN | NO |
| Differential Pressure | UP | DOWN | NO |
| Cooling Twr Sump Temperature | UP | UP | YES |
| Compressor Head Pressure | UP | UP | YES |
| Tank Level Sensor: Pump fills tank | UP | DOWN | NO |
| Tank Level Sensor: Pump drains tank | UP | UP | YES |

**Para. 1003 Direction**: FORWARD only. If motor is rotating wrong, fix the rotation by wiring change.

**Accel / Decel times (Group 22)**: These are to be set to allow for quick response without causing drive to go into current limit on either accel or decel. Normally accel and decel times should be less than 4002, INTEGRATION TIME, to prevent interference with PID operation.

**Para. 4001 GAIN:** Initial setup value = 2.2. Too high and unit will start surging. Too low and drive will not respond fast enough.

**Para. 4002 INTEGRATION TIME**:

Liquid pumping applications = 3.0 sec.
Air pressure applications = 5.0 sec.
Cooling Tower = 60 sec.

Compressor Head Temp applications = 15 sec.

The above settings for Para. 4001 & 4002 are starting points. Any PID system will have to be tuned for proper operation. The ACH550 manual has a usable procedure to tune the PID loop.

In all ACH550 macros parameter 1106, REF 2 SELECT, defaults to 19, PID1OUT. However, parameter 1102, EXT1 / EXT2 SEL defaults to EXT1. To engage PID operation in remote, change parameter 1102 to activate the EXT2 profile, either by directly setting 1102 to EXT2 or use and activate a DI.

Cooling Towers with gearbox need a minimum speed set up for gearbox oiling. Set this minimum speed in Group 20, either parameter 2001 (VECTOR:SPEED control) or 2007 (SCALAR:FREQ control). Typically, this value is 25-30% speed.

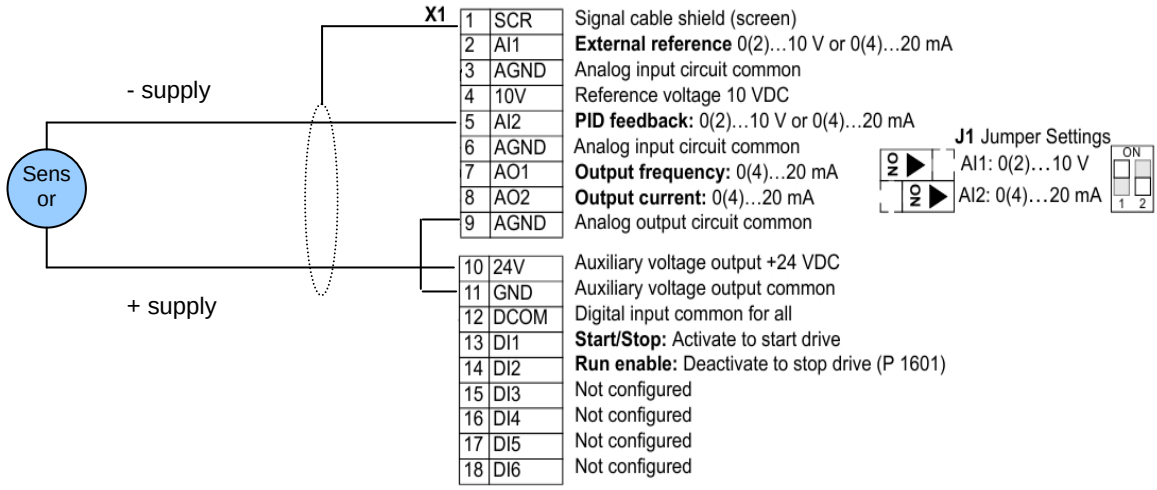
Most feedback sensors are 4-20 mA out. The AI2 switch should be ON and parameter 1304 should be set to 20%. Some sensors are 0-10 volts out. In these cases the AI2 switch should be OFF and parameter 1304 should be set to 0%.

If the pressure/temperature sensor is going to an external BMS, drive may not need to be run in PID mode as BMS will perform the PID operation and just tell the drive how fast to run.

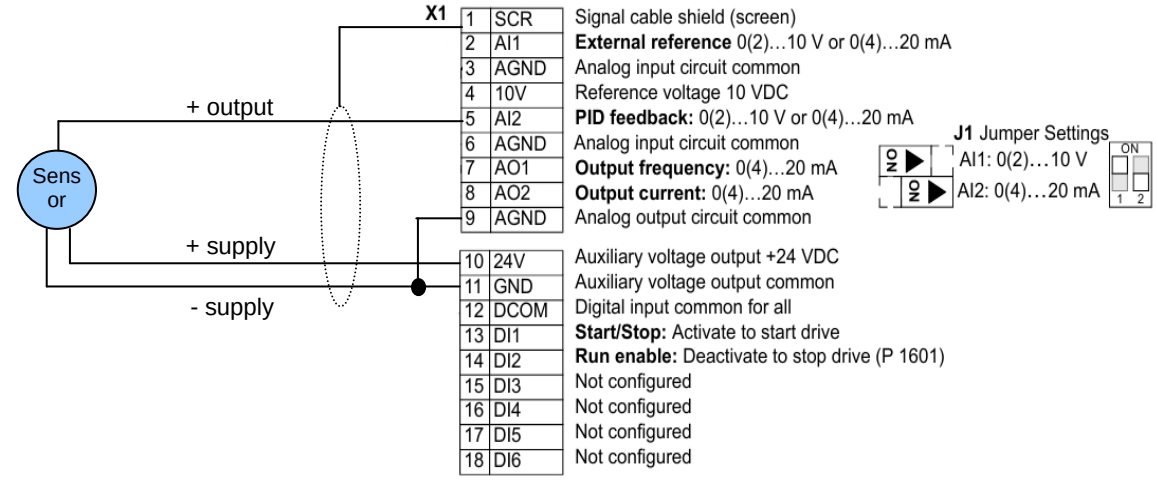
If the user wants a “pretty” display, get the system up and running using default percentage setup. Once system is running properly, then make the display “pretty” via groups 34 and 40.

# Single Transducer / Single Drive setup

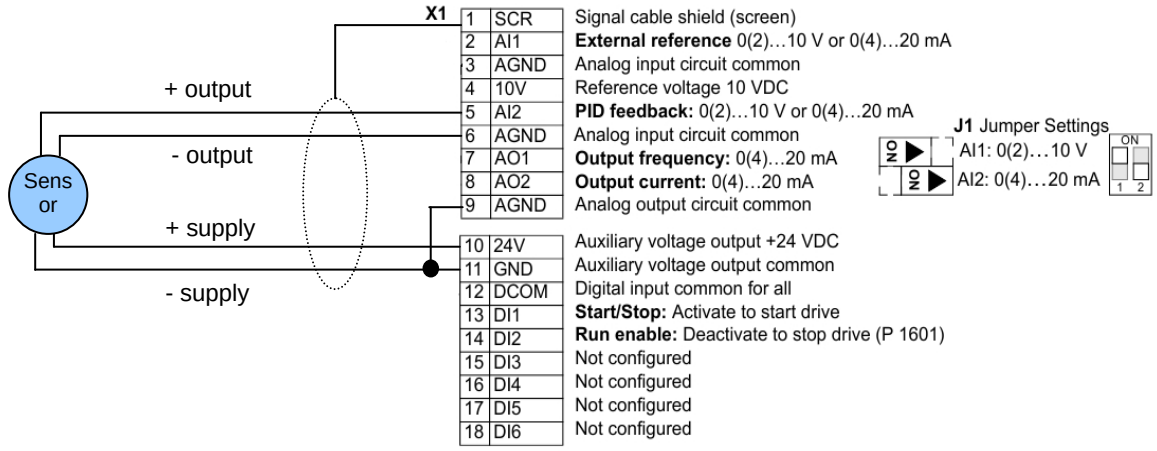
TWO WIRE SENSOR




THREE WIRE SENSOR

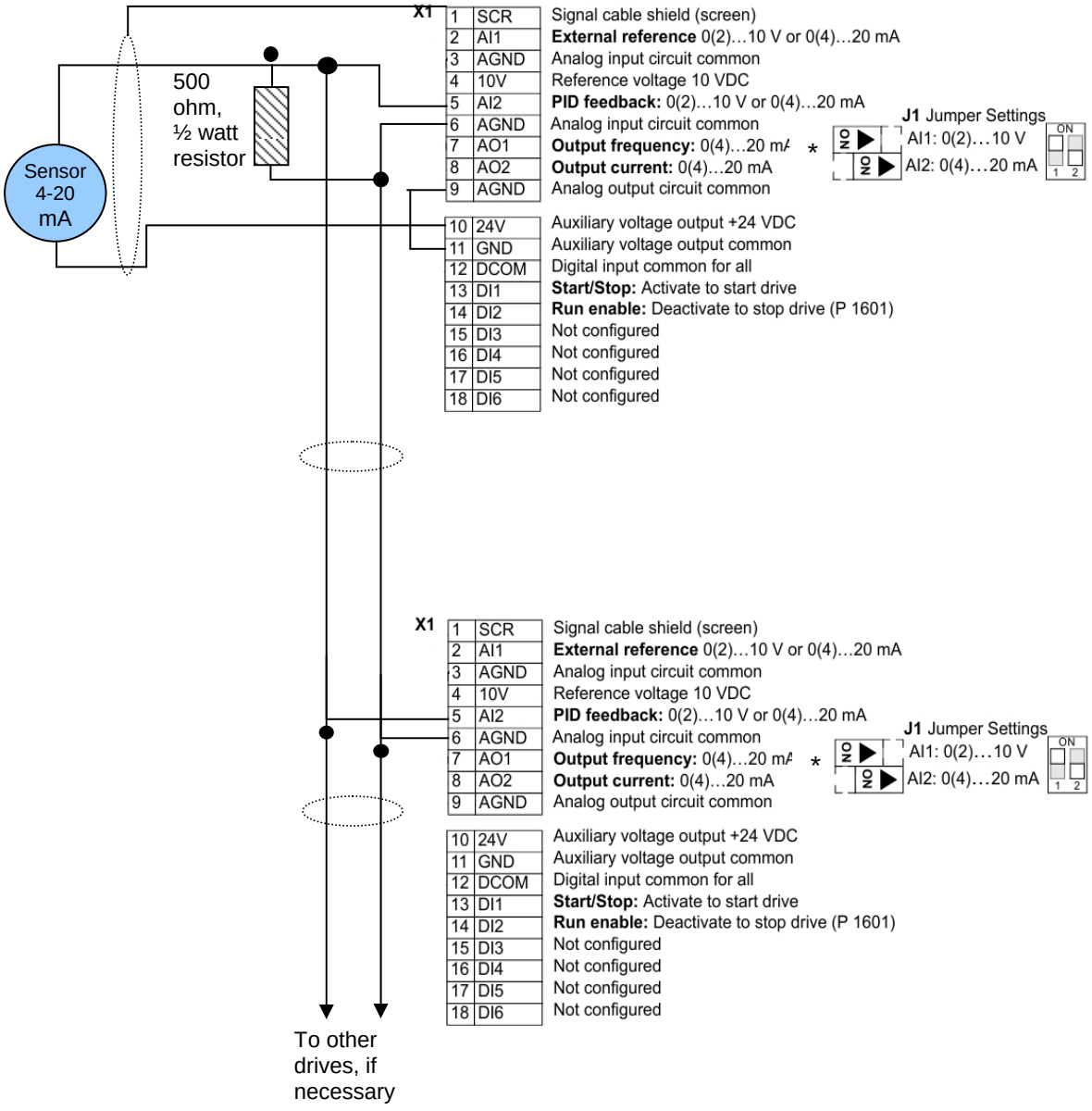



FOUR WIRE SENSOR



# ONE 4-20mA TRANSDUCER FEEDING MULTIPLE DRIVES

* All drives are set with AI2 switch OFF / para. 1304 set to 20%




***The wiring connecting the Analog inputs together between the multiple drives needs to be shielded and grounded at the "source" end only. Connecting up both ends of the shield promotes the creation of ground loops and may cause unstable and unpredictable operation.***

## Revisions

| Rev. | Section | Description of Change | Modified By | Date |
|---|---|---|---|---|
| 0 | | Initial Distribution | REP | 17 Jul 2008 |
| | | | | |