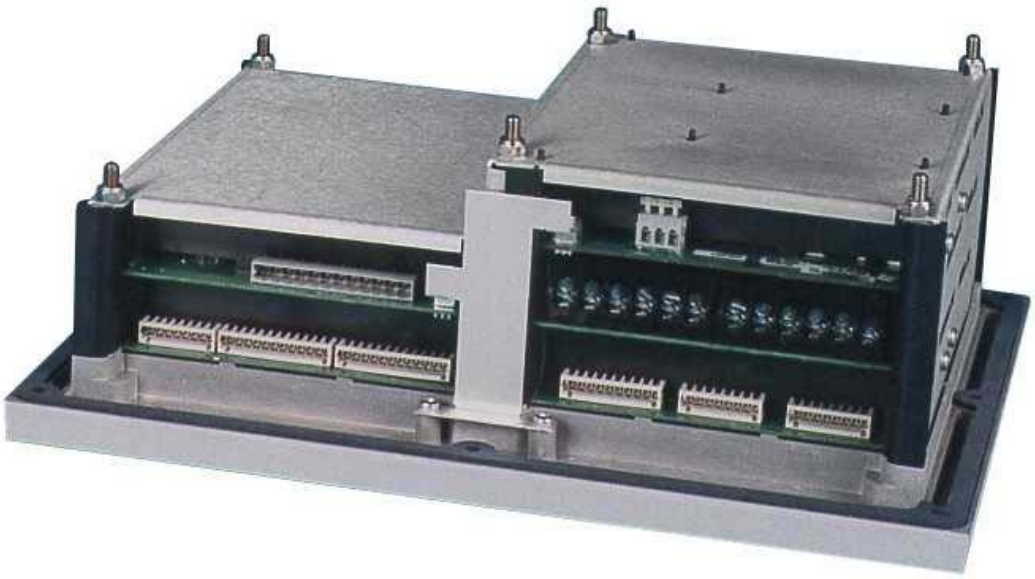
WOODWARD

**Product Manual 26609**
**(Revision NEW)**
**Original Instructions**



# AtlasSC™ Propulsion Control System 8280-1143

**Application Manual**

**General Precautions**

**Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment.**

**Practice all plant and safety instructions and precautions.**

**Failure to follow instructions can cause personal injury and/or property damage.**

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# Contents



# Illustrations and Tables

# Warnings and Notices

## Important Definitions

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

- **DANGER**—Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
- **WARNING**—Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- **CAUTION**—Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE**—Indicates a hazard that could result in property damage only (including damage to the control).
- **IMPORTANT**—Designates an operating tip or maintenance suggestion.

**⚠WARNING**

**Overspeed / Overtemperature / Overpressure**

**The engine, turbine, or other type of prime mover should be equipped with an overspeed shutdown device to protect against runaway or damage to the prime mover with possible personal injury, loss of life, or property damage.**

**The overspeed shutdown device must be totally independent of the prime mover control system. An overtemperature or overpressure shutdown device may also be needed for safety, as appropriate.**

**⚠WARNING**

**Personal Protective Equipment**

**The products described in this publication may present risks that could lead to personal injury, loss of life, or property damage. Always wear the appropriate personal protective equipment (PPE) for the job at hand. Equipment that should be considered includes but is not limited to:**

- **Eye Protection**
- **Hearing Protection**
- **Hard Hat**
- **Gloves**
- **Safety Boots**
- **Respirator**

**Always read the proper Material Safety Data Sheet (MSDS) for any working fluid(s) and comply with recommended safety equipment.**

**⚠WARNING**

**Start-up**

**Be prepared to make an emergency shutdown when starting the engine, turbine, or other type of prime mover, to protect against runaway or overspeed with possible personal injury, loss of life, or property damage.**

**⚠WARNING**

**Automotive Applications**

**On- and off-highway Mobile Applications: Unless Woodward's control functions as the supervisory control, customer should install a system totally independent of the prime mover control system that monitors for supervisory control of engine (and takes appropriate action if supervisory control is lost) to protect against loss of engine control with possible personal injury, loss of life, or property damage.**

**NOTICE**

**Battery Charging Device**

**To prevent damage to a control system that uses an alternator or battery-charging device, make sure the charging device is turned off before disconnecting the battery from the system.**

# Electrostatic Discharge Awareness

**NOTICE**

**Electrostatic Precautions**

**Electronic controls contain static-sensitive parts. Observe the following precautions to prevent damage to these parts:**

- **Discharge body static before handling the control (with power to the control turned off, contact a grounded surface and maintain contact while handling the control).**
- **Avoid all plastic, vinyl, and Styrofoam (except antistatic versions) around printed circuit boards.**
- **Do not touch the components or conductors on a printed circuit board with your hands or with conductive devices.**

**To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual *82715*, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.**

Follow these precautions when working with or near the control.

1. Avoid the build-up of static electricity on your body by not wearing clothing made of synthetic materials. Wear cotton or cotton-blend materials as much as possible because these do not store static electric charges as much as synthetics.
2. Do not remove the printed circuit board (PCB) from the control cabinet unless absolutely necessary. If you must remove the PCB from the control cabinet, follow these precautions:
   - Do not touch any part of the PCB except the edges.
   - Do not touch the electrical conductors, the connectors, or the components with conductive devices or with your hands.
   - When replacing a PCB, keep the new PCB in the plastic antistatic protective bag it comes in until you are ready to install it. Immediately after removing the old PCB from the control cabinet, place it in the antistatic protective bag.

# Chapter 1.
# General Information

## About this Manual

This manual describes the following system part number:

- 8280-1143 AtlasSC* Propulsion Control

For additional information about the control, see hardware manual 26179.

## System Description

This AtlasSC control system is designed to replace the 537 Digital Marine Control 8262-002 and 8262-055.

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# Chapter 2.
# System Software and HMI Functionality

**WARNING**

**An unsafe condition could occur with improper use of the HMI tools. Only trained personnel should access the control with these tools.**

This chapter provides detailed information on the system software functions and instructions for their configuration and calibration via the HMI application (Woodward *ToolKit*).

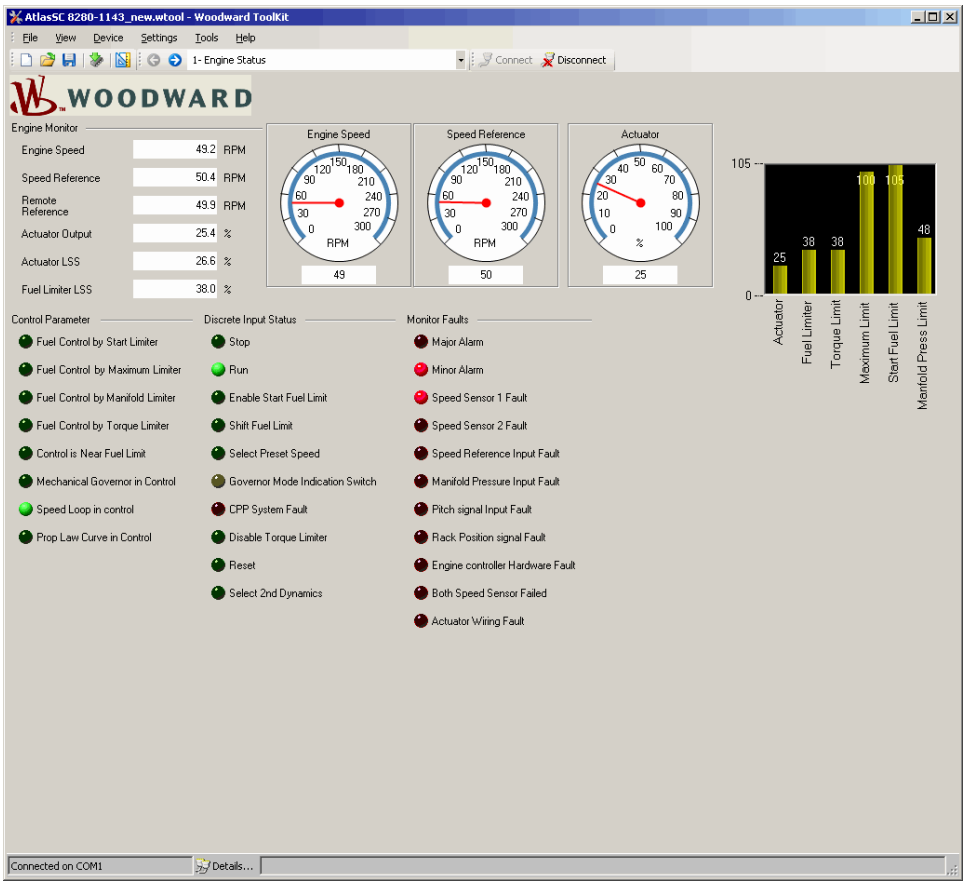



Figure 2-1. Engine Status

The first screen is the engine overview status and displays all info about the engine control.

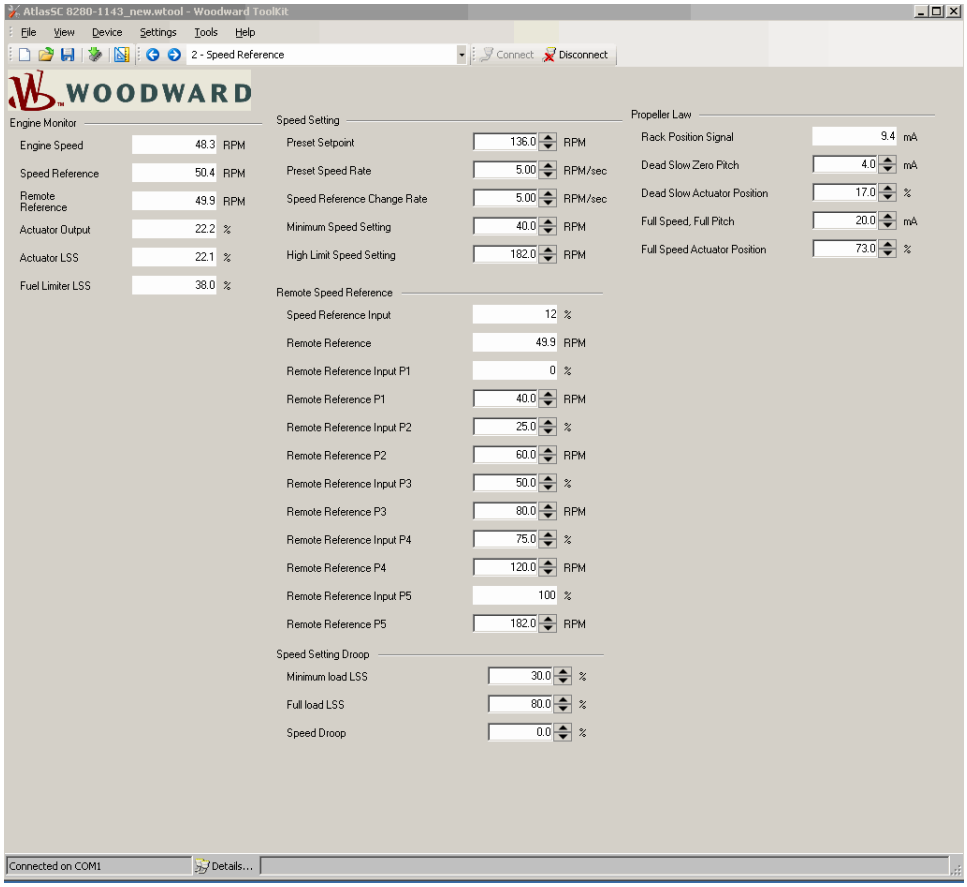



Figure 2-2. Speed Reference

The second screen is for setting the speed reference of the engine.

Below a description of the parameters on this screen.

**** Speed Setting ****

**Preset Setpoint**, range: *136.0 (50.0, 300.0) _____rpm
Speed setting for preset speed.

**Preset Speed Rate**, range *5.0 (1.0, 100.0) _____ rpm/sec
Ramp rate for moving to preset setpoint.

**Speed Reference Change Rate**, range *5.0 (0.05, 20.0) _____ rpm/sec
Ramp rate when normal operation.

**Minimum Speed Setting**, range *40.0 (10.0, 200.0) _____rpm
Enter minimum speed limit of the speed setting signal at 4 mA.

**High Limit Speed Setting**, range *182.0 (50.0, 300.0) _____rpm
Enter maximum speed limit of the speed setting signal at 20 mA.

**** Remote Speed Reference ****
The following section allows the user setup the speed reference schedule as a function of the speed setting signal input. The schedule has four sections and five set up points.

**Speed Reference Input**, %
Display of the reference in percentage.

**Remote Reference**, rpm
Display of the remote reference setting in rpm.

**Remote Reference Input P1**, range: _____%
Indicates status of speed setting signal input

**Remote Reference P1**, range: *40.0 (10.0, 300.0) _____rpm
Rpm for first set point.

**Remote Reference Input P2**, range: *25.0 (0.0, 100.0) _____%
Input percentage for second set point.

**Remote Reference P2**, range: *60.0 (10.0, 300.0) _____rpm
Rpm for second set point.

**Remote Reference Input P3**, range *50.0 (0.0, 100.0) _____%
Input percentage for third set point.

**Remote Reference P3**, range *80.0 (10.0, 300.0) _____rpm
Rpm for third set point.

**Remote Reference Input P4**, range *75.0 (0.0, 100.0) _____%
Input percentage for fourth set point.

**Remote Reference P4**, range *120.0 (10.0, 300.0) _____rpm
Rpm for fourth set point.

**Remote Reference Input P5**, %
Input percentage for fifth set point.

**Remote Reference P5**, range *182.0 (10.0, 300.0) _____rpm
Rpm for fifth set point.

**** Speed Setting Droop ****
Calibration of the droop line.

**Minimum Load LSS**, range: *30.0 (0.0, 100.0) _____%
LSS percentage at minimum load.

**Full Load LSS**, range: *80.0 (0.0, 100.0) _____%
LSS percentage at maximum load.

**Speed Droop**, range: *0.0 (0.0, 10.0) _____%
Enter the percentage speed will droop at maximum load.

**** Propeller Law ****
The following section allows the user to set up the propeller law schedule as a function of fuel rack vs actuator LSS%.

**Rack Position Signal**, mA
Display of the rack signal input in mA.

**Dead Slow Zero Pitch**, range: *4.0 (0.0, 25.0) _____mA
Set of Rack position signal at dead slow operation.

**Dead Slow Actuator Position**, % range: *17.0 (0.0, 100.0) _____%
Set of actuator position percentage at dead slow operation.

**Full Speed Full Pitch**, range: *20.0 (0.0, 25.0) _____mA
Set of rack position signal at full speed operation.

**Full Speed Actuator Position**, range: *73.0 (0.0, 100.0) _____%
Set of actuator position percentage set at full speed operation.

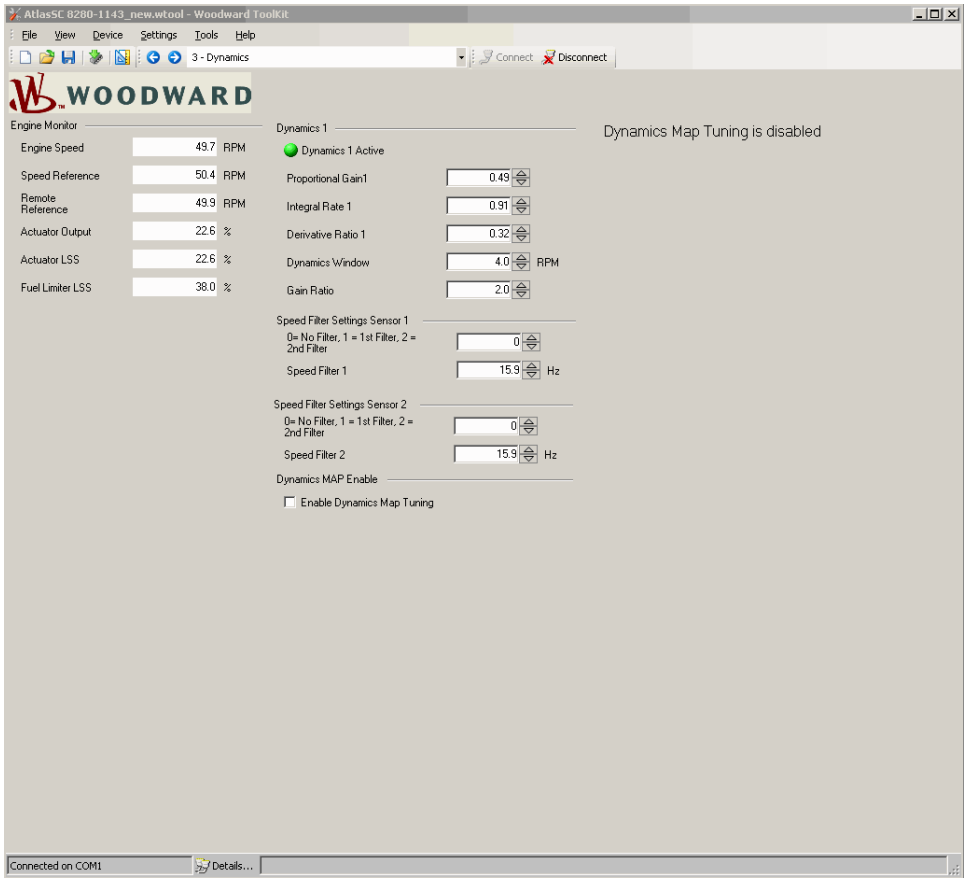



Figure 2-3. Dynamics

Here the dynamics of the engine control can be adjusted.

**** DYNAMICS1 ****

**Proportional Gain 1** *0.49 (0.01, 20.0) _____
PID proportional gain adjustment for dynamics #1. Increasing the P increase the gain, a value for P that is too large will cause oscillation, if P is too small the offspeed from a transient will be too large.

**Integrator Rate 1** *1.0 (0.01, 50.0) _____
PID integrator rate adjustment for dynamics #1, affects speed recovery rate after a speed transient. If I is too small the actuator current will move too fast and speed will overshoot and response will be under damped. When I is too large, the actuator slowly and current will change speed will take a long time to return to set speed after a transient, giving overdamped response.

**Derivative Ratio 1** *5.0 (0.01, 100.0) _____
PID derivative ratio adjustment for dynamics #1. Set the amount of derivative (or lead) action the control will have. Increasing the derivative ratio value will decrease the derivative function giving the control a PI type action. A value too large will make the system less responsive. A value too small will make the system oscillate, and cannot be compensated for with the proportional gain or the integrator rate.

**Dynamics Window**, *4.0 (1.0, 50.0) _____ rpm
Dynamics Window is the magnitude (in rpm) of a speed error at which the control automatically switches to fast response.

**Gain Ratio** *2.0 (0.5, 5.0) _____
Gain Ratio is the ratio of the Gain setting at steady state to the Gain setting during transient conditions. The Gain Ratio operates in conjunction with the Window Width and Gain adjustments by multiplying the Gain set point by the Gain Ratio when the speed error is greater than the Window Width.

** Speed Filter Settings Sensor 1 ** and ** Speed Filter Settings Sensor 2 **

0= No Filter, 1 = 1st Filter, 2 = 2nd Filter
Sets the type of filtering being used.

**Speed Filter**, *15.9 (0.1, 20.0) _____Hz
Speed filter adjusts the frequency of a low pass filter used on the speed-sensing input.

Dynamics 2 are only shown on this screen when:
Two Sets of Dynamics Required ? is selected, which can be found on screen 7-configuration.

**** DYNAMICS2 ****

**Proportional Gain 2** *0.49 (0.01, 20.0) _____
PID proportional gain adjustment for dynamics #2. Increasing the P increase the gain, a value for P that is too large will cause oscillation, if P is too small the offspeed from a transient will be too large.

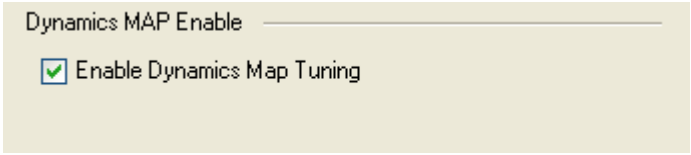
**Integrator Rate 2** *1.0 (0.01, 50.0) _____
PID integrator rate adjustment for dynamics #2, affects speed recovery rate after a speed transient. If I is too small the actuator current will move too fast and speed will overshoot and response will be under damped. When I is too large, the actuator slowly and current will change speed will take a long time to return to set speed after a transient, giving overdamped response.

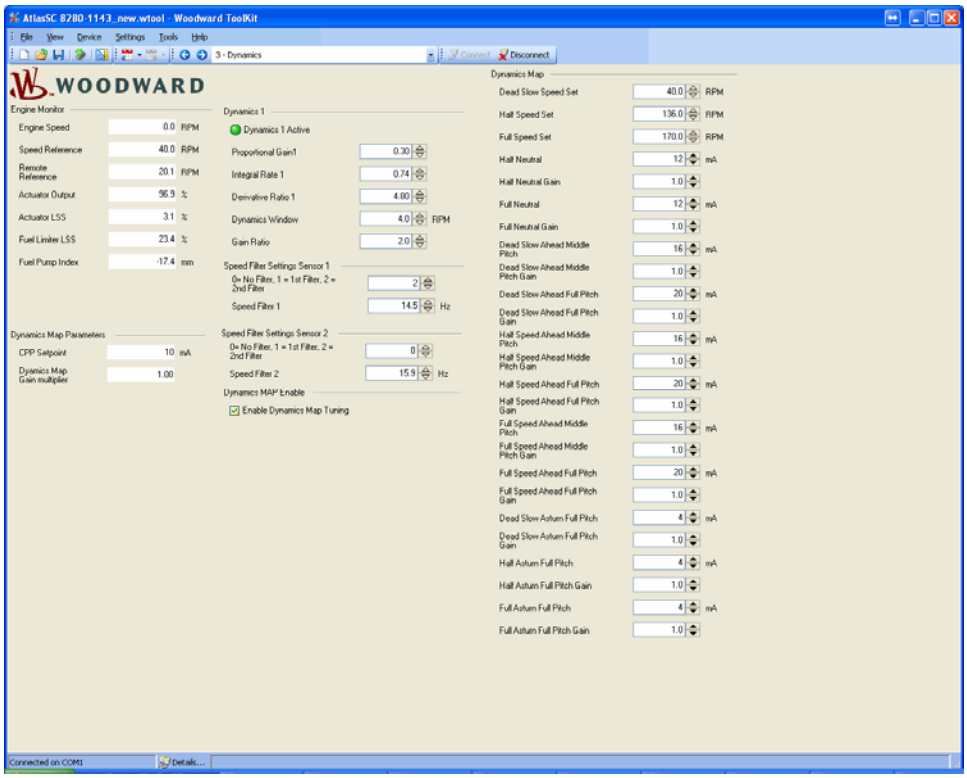
**Derivative Ratio 2** *5.0 (0.01, 100.0) _____
PID derivative ratio adjustment for dynamics #2. Set the amount of derivative (or lead) action the control will have. Increasing the derivative ratio value will decrease the derivative function giving the control a PI type action. A value too large will make the system less responsive. A value too small will make the system oscillate, and cannot be compensated for with the proportional gain or the integrator rate.

**** Dynamics Map Enable ****

**Enable Dynamics Map Tuning** *TRUE (TRUE, FALSE) _____
When selected it displays the dynamics map, at this screen.

The values entered are always active. See picture below:




**** DYNAMICS MAP ****
Dynamics map tuning is not visible (Box does not appear on screen 3) when ** Dynamics Map Enable ** **Enable Dynamics Map Tuning** is not selected.
The values entered are always active.

**Dead Slow Speed Set**, rpm = *40.0 (10.0, 300.0) _____
Enter the rpm that dead slow speed.

**Half Speed Set,** rpm = *136.0 (10.0, 300.0) _____
Enter the rpm that half speed set point.

**Full Speed Set**, rpm = *170.0 (10.0, 300.0) _____
Enter the rpm that full speed set point.

**Half Neutral**, mA = *12.0 (4.0, 20.0) _____
Input cpp neutral mA for half speed.

**Half Neutral Gain**, = *1.0 (0.1, 10.0) _____
Adjustment for gain constant of half speed /cpp neutral.

**Full Neutral**, mA = *12.0 (4.0, 20.0) _____
Input cpp neutral mA for full speed.

**Full Neutral Gain**, = *1.0 (0.1, 10.0) _____
Adjustment for gain constant of full speed /cpp neutral.

**Dead Slow Ahead Middle Pitch**, mA = *16.0 (4.0, 20.0) _____
Input cpp ahead middle pitch mA for dead slow.

**Dead Slow Ahead Middle Pitch Gain**, = *1.0 (0.1, 10.0) _____
Adjustment for gain constant of dead slow /cpp ahead middle pitch.

**Dead Slow Ahead Full Pitch**, mA = *20.0 (4.0, 20.0) _____
Input cpp ahead full pitch mA for dead slow.

**Dead Slow Ahead Full Pitch Gain**, = *1.0 (0.1, 10.0) _____
Adjustment for gain constant of dead slow /cpp ahead full pitch.

**Half Speed Ahead Middle Pitch**, mA = *16.0 (4.0, 20.0) _____
Input cpp ahead middle pitch mA for half speed.
\
**Half Speed Ahead Middle Pitch Gains**, = *1.0 (0.1, 10.0) _____
Adjustment for gain constant of half speed /cpp ahead middle pitch.

**Half Speed Ahead Full Pitch**, mA = *20.0 (4.0, 20.0) _____
Input cpp ahead full pitch mA for half speed.

**Half Speed Ahead Full Pitch Gains**, = *1.0 (0.1, 10.0) _____
Adjustment for gain constant of half speed /cpp ahead full pitch.

**Full Speed Ahead Middle Pitch**, mA = *16.0 (4.0, 20.0) _____
Input cpp ahead middle pitch mA for full speed.

**Full Speed Ahead Middle Pitch Gains**, = *1.0 (0.1, 10.0) _____
Adjustment for gain constant of full speed /cpp ahead middle pitch.

**Full Speed Ahead Full Pitch**, mA = *20.0 (4.0, 20.0) _____
Input cpp ahead full pitch mA for full speed.

**Full Speed Ahead Full Pitch Gains**, = *1.0 (0.1, 10.0) _____
Adjustment for gain constant of full speed /cpp ahead full pitch.

**Dead Slow Astern Full Pitch**, mA = *4.0 (4.0, 20.0) _____
Input cpp astern full pitch mA for dead slow.

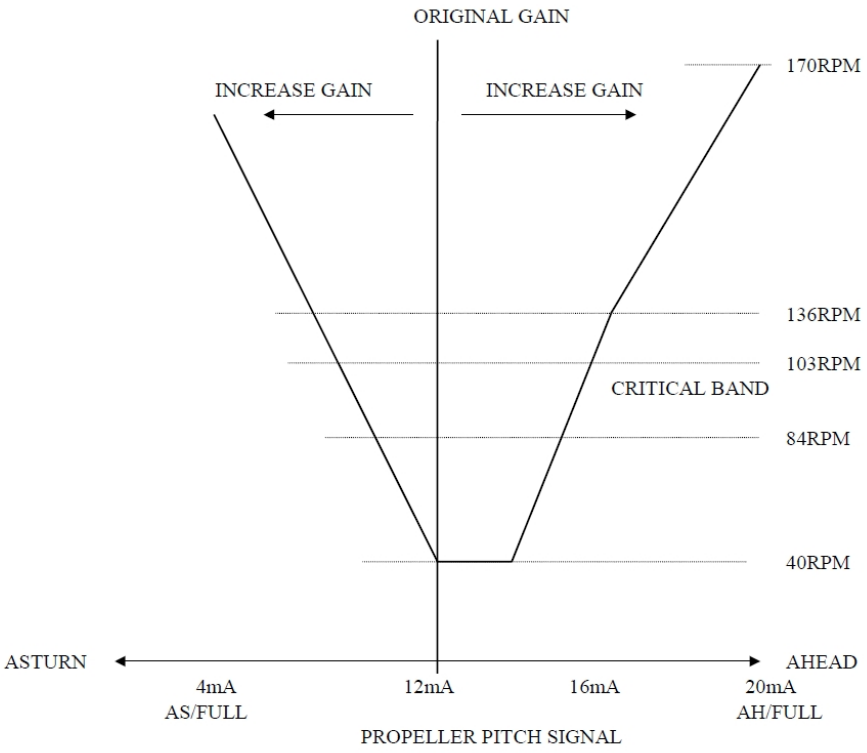
**Dead Slow Astern Full Pitch Gain**, = *1.0 (0.1, 10.0) _____
Adjustment for gain constant of dead slow /cpp astern full pitch.

**Half Astern Full Pitch**, mA = *4.0 (4.0, 20.0) _____
Input cpp astern full pitch mA for half speed.

**Half Astern Full Pitch Gain**, = *1.0 (0.1, 10.0) _____
Adjustment for gain constant of half speed /cpp astern full pitch.

**Full Astern Full Pitch**, mA = *4.0 (4.0, 20.0) _____
Input cpp astern full pitch mA for full speed

**Full Astern Full Pitch Gain**, = *1.0 (0.1, 10.0) _____
Adjustment for gain constant of full speed /cpp astern full pitch.



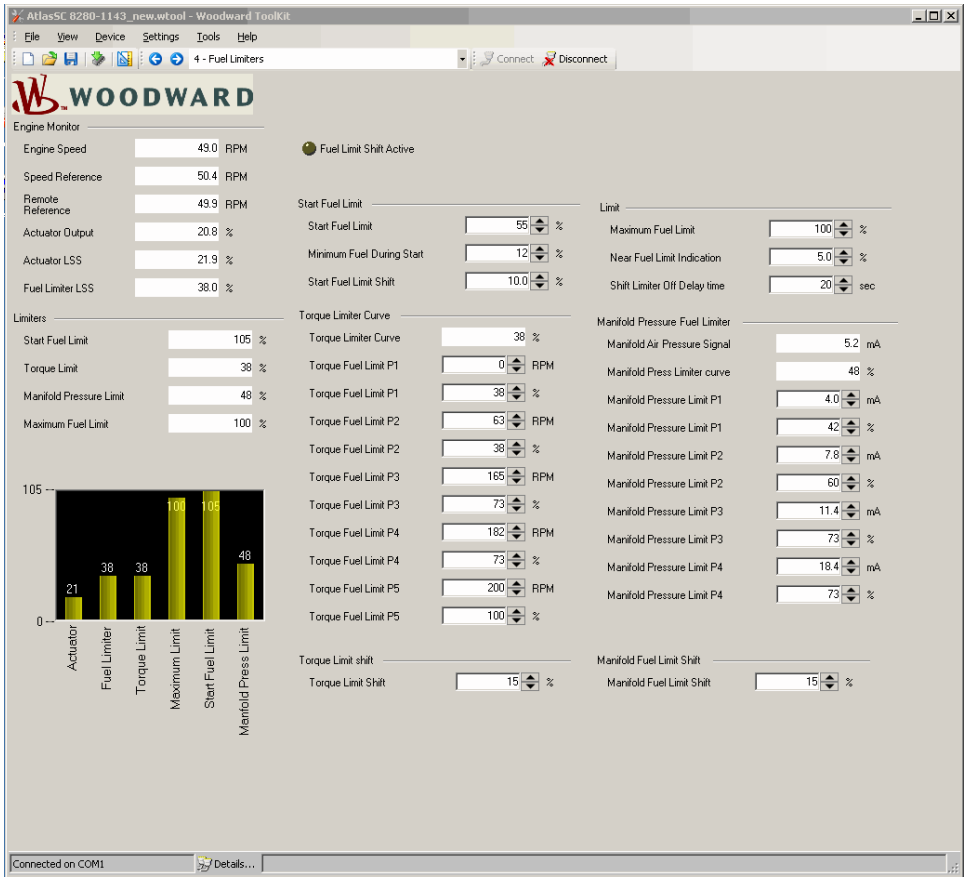




Figure 2-4. Fuel Limiters

The following section allows the user to set up the Fuel limiters within the control.

**** Limiters ****
Displays the different fuel limiters.
The lowest limiter will limit the control PID for over fueling the engine.

**Start Fuel Limit**, Indicates the status of the start fuel level.

**Torque Limit,** Indicates the status of the torque fuel limiter schedule.

**Manifold Pressure Limit**, status of MAP limit.

**Maximum Fuel Limit**, status of maximum Fuel.

**Fuel Limit Shift Active**, Indicates the status of the fuel limiter LSS, this is the result of all limiters present.

**** Start Fuel Limit ****

**Start Fuel Limit** range *55.0 (25.0, 110.0) _____%
Maximum actuator rack % during starting.

**Minimum Fuel During Start**, range *12.0 (0.0, 50.0) _____%
Minimum actuator rack % during starting.

**Start Fuel Limit Shift** range *10.0 (0.0, 25.0) _____%
Percent of shift that can be added to the start fuel level;
Enabled by the fuel limit shift switch.

**** Torque Limiter Curve ****
The following section allows the user to set up the torque fuel limiter schedule
The torque limit schedule consists of 5 sections and 6 set up points.

**Torque Limiter Curve**,
Indicates the status of the torque fuel limiter schedule.

**Torque Fuel Lim P1**, rpm = *0.0 (0.0, 300.0) _____
Rpm for first setpoint.

**Torque Fuel Lim P1**, % = *38.0 (0.0, 110.0) _____
Fuel rack percentage for first setpoint.

**Torque Fuel Lim P2**, rpm = *63.0 (0.0, 300.0) _____
Rpm for second setpoint.

**Torque Fuel Lim P2**, % = *38.0 (0.0, 110.0) _____
Fuel rack percentage for second setpoint.

**Torque Fuel Lim P3**, rpm = *165.0 (0.0, 300.0) _____
Rpm for third setpoint.

**Torque Fuel Lim P3**, % = *73.0 (0.0, 110.0) _____
Fuel rack percentage for third setpoint.

**Torque Fuel Lim P4**, rpm = *182.0 (0.0, 300.0) _____
Rpm for fourth setpoint.

**Torque Fuel Lim P4**, % = *73.0 (0.0, 110.0) _____
Fuel rack percentage for fourth setpoint.

**Torque Fuel Lim P5**, rpm = *200.0 (0.0, 300.0) _____
Rpm for fifth setpoint.

**Torque Fuel Lim P5**, % = *100.0 (0.0, 110.0) _____
Fuel rack percentage for fifth setpoint.

**** Torque Limiter Shift ****

**Torque Limit Shift**, range *15.0 (0.0, 25.0) _____%
Percent of shift that can be added to the torque fuel limiter schedule;
Enabled by the fuel limit shift switch.

**** Limit ****

**Maximum Fuel Limit** % = *100.0 (50.0, 110.0) _____
Used to set the maximum fuel rack position.

**Near Fuel Limit Indication** % = *5.0 (0.5, 20.0) _____
Set point at which the near fuel limiter relay is activated. The relay is turned on when the actuator LSS is within this percentage of the limiter LSS.

**Shift Limiter Off Delay time**, sec = *20.0 (0.0, 60.0) _____
Set of delay time to a shift fuel limit release.

**** Manifold Pressure Fuel Limiter ****
The following section allows the user to set up the manifold pressure fuel limiter schedule. The manifold pressure limit schedule has 3 sections and 4 set-up points.

**Manifold Air Pressure Signal** (mA)= _____
Indicates status of the manifold pressure signal input.

**Manifold Press Limiter curve** % = _____
Indicates status of the manifold pressure fuel limiter schedule.

**Manifold Pressure Limit P1**, mA in= *4.0 (0.0, 25.0) _____
Pressure input for first setpoint.

**Manifold Pressure Limit P1**, %= *42.0 (0.0, 110.0) _____
Rack percentage for first setpoint.

**Manifold Pressure Limit P2**, mA in= *7.8 (0.0, 25.0) _____
Pressure input for second setpoint.

**Manifold Pressure Limit P2**, %= *60.0 (0.0, 110.0) _____
Rack percentage for second setpoint.

**Manifold Pressure Limit P3**, mA in= *11.4 (0.0, 25.0) _____
Pressure input for third setpoint.

**Manifold Pressure Limit P3**, %= *73.0 (0.0, 110.0) _____
Rack percentage for third setpoint.

**Manifold Pressure Limit P4**, mA in= *18.4 (0.0, 25.0) _____
Pressure input for fourth setpoint.

**Manifold Pressure Limit P4**, %= *73.0 (0.0, 110.0) _____
Rack percentage for fourth setpoint.

**** Manifold Fuel Limit Shift ****

**Manifold Fuel Limit Shift** % = *15.0 (0.0, 25.0) _____
Percent of shift that can be added to the manifold pressure fuel limiter schedule; Enabled by the fuel limit shift switch.

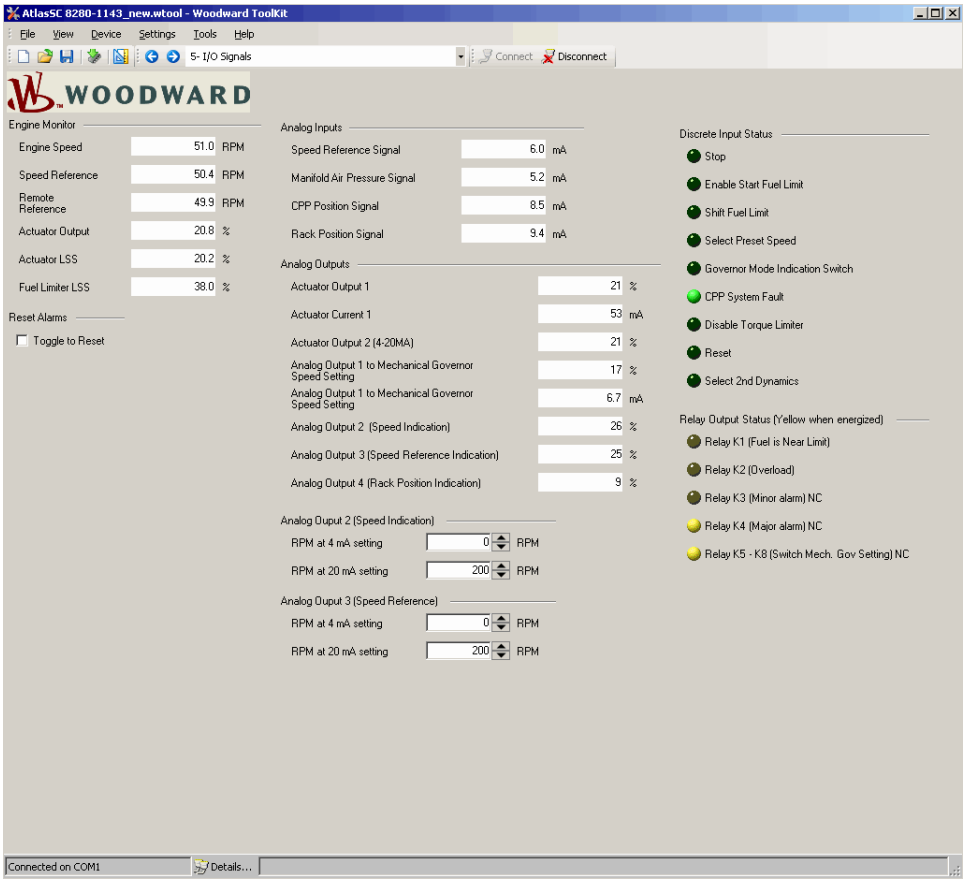



Figure 2-5. I/O Signals

Scaling for Analog Output 2 (Speed indication) is set here.
Scaling for Analog Output 3 (Speed reference) is set here.

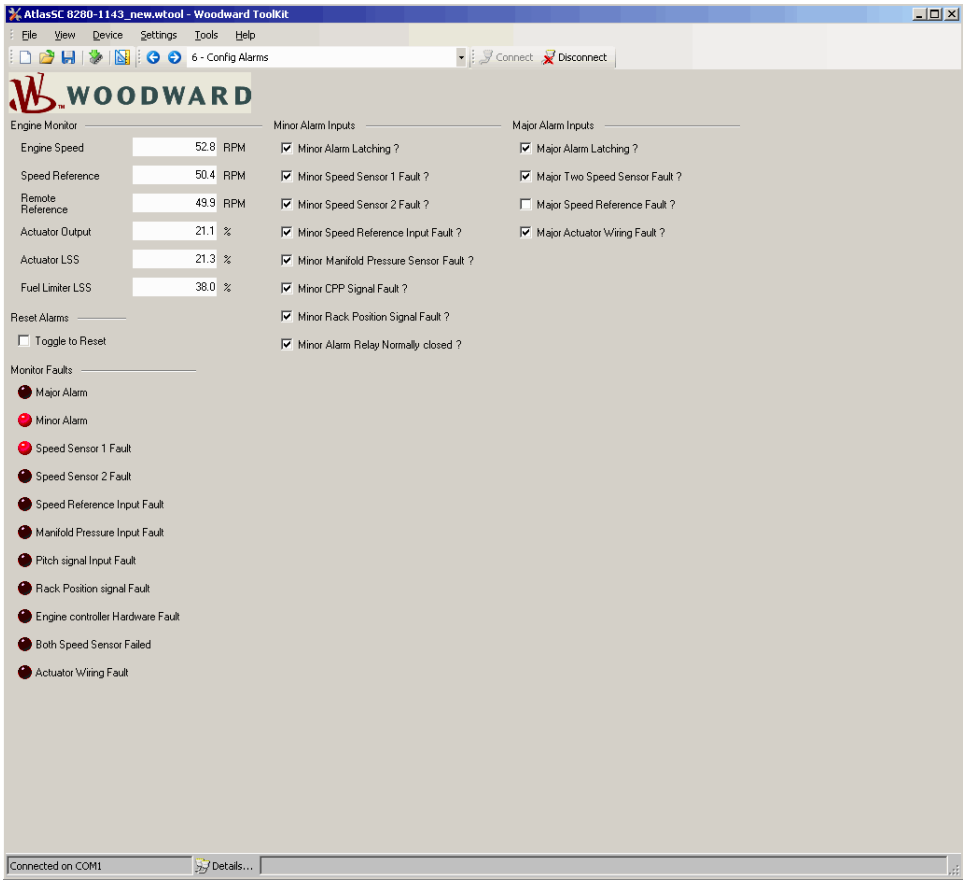



Figure 2-6. Config Alarms

**** MINOR ALARM ****

**Minor Alarm Latching ?** *TRUE (TRUE, FALSE) _____

**Minor-Speed Sensor 1 Fault ?** *TRUE (TRUE, FALSE) _____
Minor alarm given when speed sensor #1 has a fault.

**Minor-Speed Sensor 2 Fault ?** *TRUE (TRUE, FALSE) _____
Minor alarm given when speed sensor #2 has a fault.

**Minor-Speed Reference Input Fault ?** *TRUE (TRUE, FALSE) _____
Minor alarm given when speed reference input has a fault.

**Minor-Manifold Pressure Sensor Fault ?** *TRUE (TRUE, FALSE) _____
Minor alarm given when manifold pressure input has a fault.

**Minor CPP Signal Fault ?** *TRUE (TRUE, FALSE) _____
Minor alarm given when pitch signal input has a fault.

**Minor-Rack Position Signal Fault ?** *TRUE (TRUE, FALSE) _____
Minor alarm given when rack position input has a fault.

**Minor Alarm Relay Normally Closed ?** *TRUE (TRUE, FALSE) _____
Selects minor alarm relay contacts normally open or normally closed.

**** MAJOR ALARM ****

**Major Alarm Latching ?** *TRUE (TRUE, FALSE) _____

**Major-Two Seepd Sensor Fault ?** *TRUE (TRUE, FALSE) _____
Major alarm given when both speed sensors have a fault.

**Major-Speed Reference Fault ?** *FALSE (TRUE, FALSE) _____
Major alarm given when the speed reference input has a fault.

**Major-Actuator Wiring Fault ?** *TRUE (TRUE, FALSE) _____
Major alarm given when the actuator wiring has a fault(open or short).

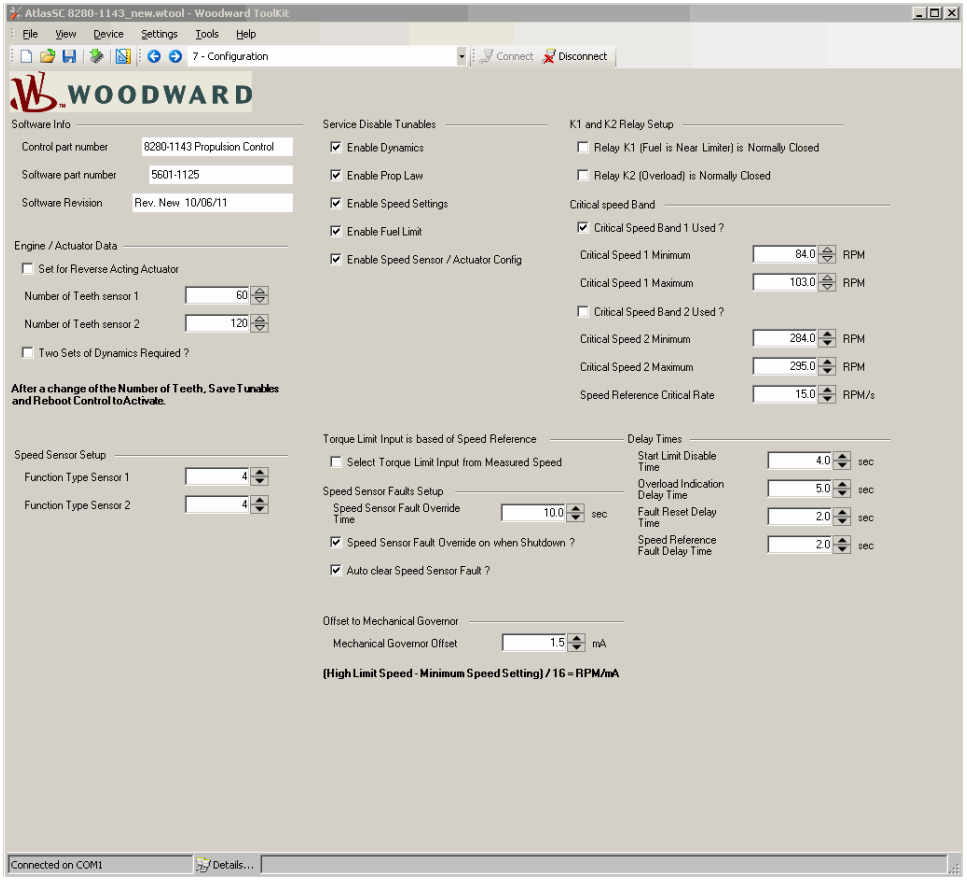



Figure 2-7. Configuration

**Set for Reverse Acting Actuator ?** *Enable by selecting
YES selects a reverse acting actuator.
No selects a forward acting actuator.

**Number of Teeth sensor 1** = *60 (1, 200)
Enter number of teeth on flywheel.

**Number of Teeth sensor 2** = *120 (1, 200)
Enter number of teeth on flywheel.

**IMPORTANT** **When the number of teeth is changed, save the settings and reboot the AtlasSC.**

**Two Set of Dynamics Required?** *NO (YES, NO)
If check box selected, external switch which selects #2 dynamics is enabled.

**Select Torque Limit Input From Measured Speed** ? *FALSE (TRUE, FALSE)
Answering a TRUE will set up the torque fuel limiter schedule as a function of speed. A FALSE sets up the schedule as a function of the speed reference.

**Speed Sensor Fault Override Time**, sec = *10.0 (1.0, 300.0) _____
Time the speed sensor fault override stays active after fault sensing is enabled by opening stop contact.

**Speed Sensor Fault Override on when Shutdown** ? *TRUE (TRUE, FALSE)
(Speed sensor fault override on shutdown) Answering TRUE enables a speed sensor fault override during a major alarm occur.

**Auto Clear Speed Sensor Fault ?** *TRUE (TRUE, FALSE) _____
Answering TRUE will allow the Spd Sensor Fault to be cleared automatically when the MPU input is brought back above 25 rpm.

**Mechanical Governer Offset**, mA = *3.0 (0.0, 10.0)
Set of offset for mechanical governor speed reference that electric control is normal condition. When electric control becomes a trouble, this one for the difference becomes a zero, and mechanical control becomes original speed setting.

****K1 and K2 Relay Setup****

**Relay K1 (Fuel is Near Limiter) is Normal Closed** *FALSE (TRUE, FALSE)
Answering TRUE enables the K1 relay normally energize.

**Relay K2 (Overload) is Normal Closed** *FALSE (TRUE, FALSE)
Answering TRUE enables the K2 relay normally energize.

****  CRITICAL SPEED BAND  ****

**Critical Speed Band 1 Used** ? *YES (YES, NO)
If answered YES, control will prompt user to enter the minimum and maximum speeds of critical speed band #1 on the following two screens. NO disable both critical speed bands.

**Critical Speed 1 Minimum**, rpm = *84.0 (10.0, 300.0)
Enter critical speed band #1 lower limit only if YES was selected in the screen above.

**Critical Speed 1 Maximum**, rpm = *103.0 (10.0, 300.0)
Enter critical speed band #1 upper limit, can be entered only if YES was selected in the screen above.

**Critical Speed Band 2 Used ?** *NO (YES, NO)
If answered YES, control will prompt user to enter minimum and maximum speeds of critical speed band #2 on the following two screens. If answered NO, critical speed band #2 ranges will be set to zero.

**Critical Speed 2 Minimum**, rpm = *284.0 (10.0, 300.0)
Enter critical speed band #2 lower limit, can be entered only if YES was selected in the screen above.

**Critical Speed 2 Maximum**, rpm = *295.0 (10.0, 300.0)
Enter critical speed band #2 upper limit, can be entered only if YES was selected in the screen above.

****DELAY TIMES****

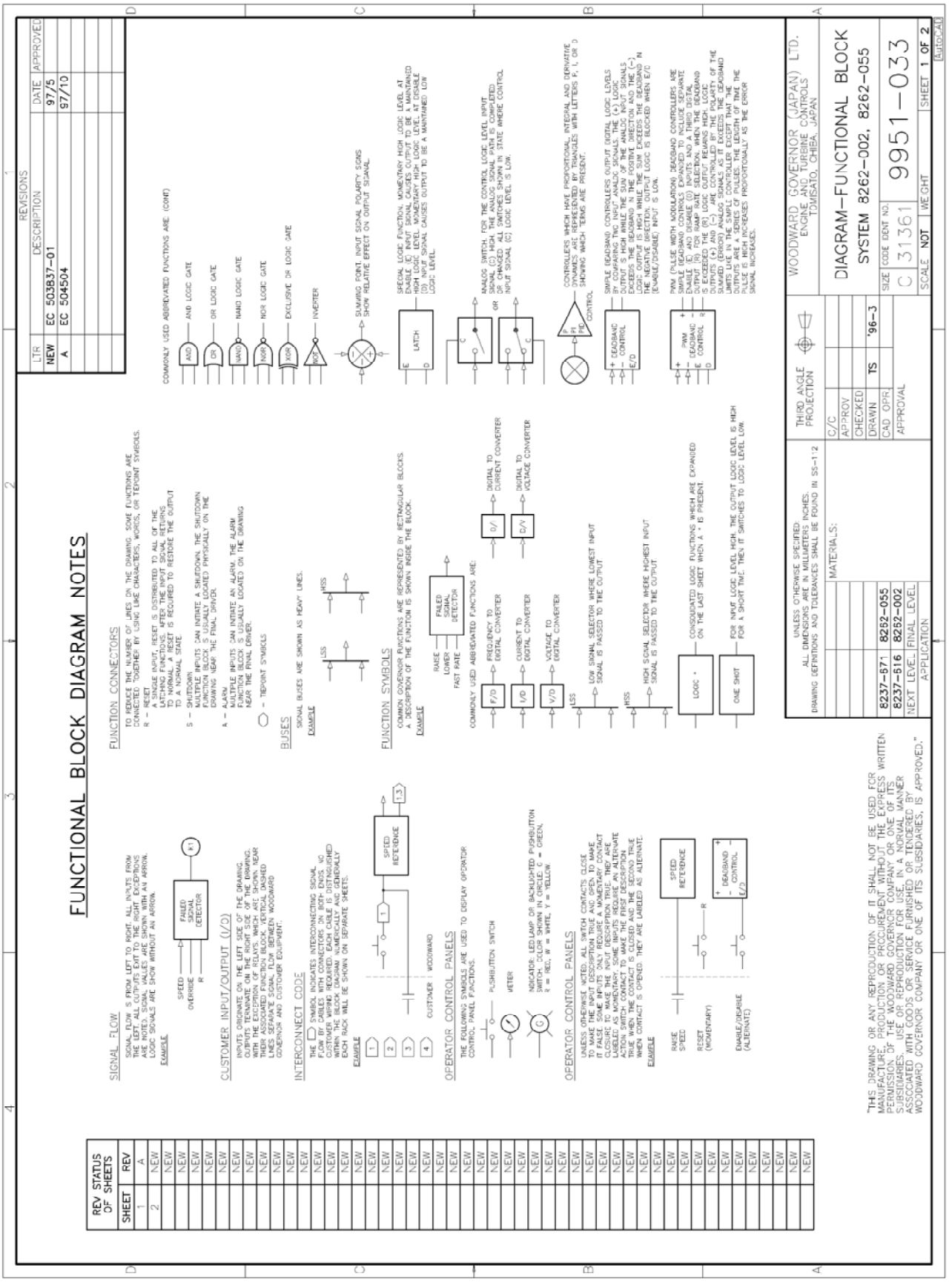
**Start Limit Disable Time**, sec = *5.0 (1.0, 60.0)
Time that the start fuel limiter remains enabled after the speed loop is in control.

**Overload Indication Delay Time,** sec = *5.0 (0.0, 10.0)
Time a overload indicate relay is turned on before overload is recognized.

**Fault Reset Delay Time**, sec = *5.0 (0.0, 180.0)
Amount of time after a fault can be reset by the external reset switch.

**Speed Reference Fault Delay Time**, sec = *2.0 (0.0, 10.0)
(Speed reference fault delay time) Time a speed setting input can be out of range before a fault is recognized.

# Chapter 3.
# Function Block Diagram


FUNCTIONAL BLOCK DIAGRAM NOTES
SIGNAL FLOW
FUNCTION CONNECTORS
CUSTOMER INPUT/OUTPUT (I/O)
INTERCONNECT CODE
OPERATOR CONTROL PANELS
BUSES
FUNCTION SYMBOLS
COMMONLY USED ABBREVIATED FUNCTIONS ARE: (CONT)
REVISIONS
LTR DESCRIPTION DATE APPROVED
NEW EC 503837-01 97/5
A EC 504504 97/10
WOODWARD GOVERNOR (JAPAN) LTD.
ENGINE AND TURBINE CONTROLS
TOMISATO, CHIBA, JAPAN
DIAGRAM-FUNCTIONAL BLOCK
SYSTEM 8262-002, 8262-055
8237-671 8262-055
8237-616 8262-002
SIZE C CODE IDENT NO. 31361
9951-033
SCALE NOT WEIGHT
SHEET 1 OF 2
THIRD ANGLE PROJECTION
UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS ARE IN MILLIMETERS INCHES.
DRAWING DEFINITIONS AND TOLERANCES SHALL BE FOUND IN SS-112
MATERIALS:
C/C
APPROV
CHECKED
DRAWN TS '96-3
CAD OPR
APPROVAL
NEXT LEVEL FINAL LEVEL
APPLICATION
REV STATUS OF SHEETS
SHEET REV
THIS DRAWING OR ANY REPRODUCTION OF IT SHALL NOT BE USED FOR MANUFACTURE, PRODUCTION OR PROCUREMENT WITHOUT THE EXPRESS PERMISSION OF THE WOODWARD GOVERNOR COMPANY OR ONE OF ITS SUBSIDIARIES. USE OR REPRODUCTION FOR USE IN A NORMAL MANNER ASSOCIATED WITH GOODS OR SERVICE FURNISHED OR TENDERED BY WOODWARD GOVERNOR COMPANY OR ONE OF ITS SUBSIDIARIES, IS APPROVED.
AutoCAD

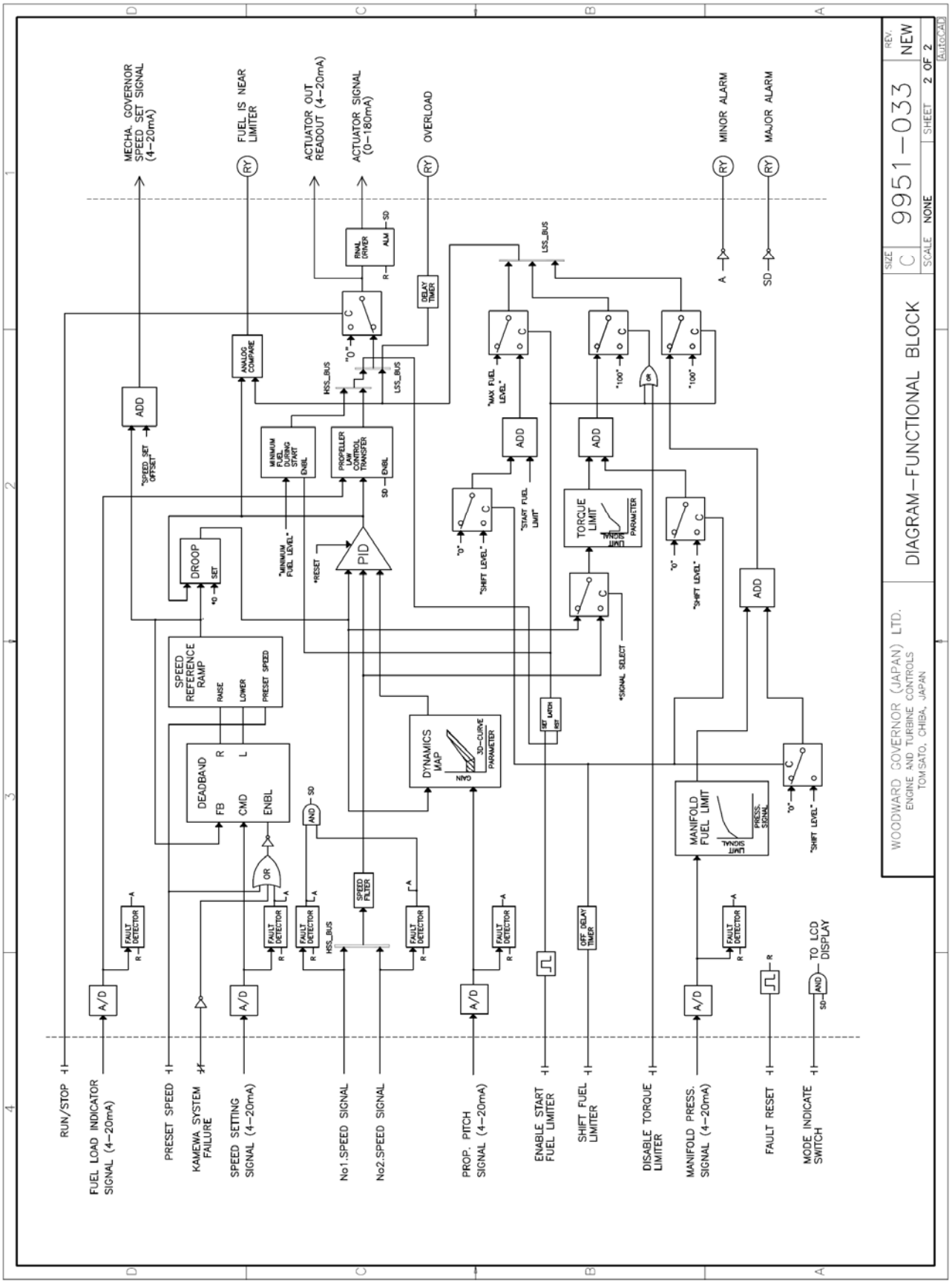


DIAGRAM-FUNCTIONAL BLOCK
WOODWARD GOVERNOR (JAPAN) LTD.
ENGINE AND TURBINE CONTROLS
TOMSATO, CHIBA, JAPAN
9951-033
NEW
SIZE C
SCALE NONE
SHEET 2 OF 2
MECHA GOVERNOR SPEED SET SIGNAL (4-20mA)
FUEL IS NEAR LIMITER
ACTUATOR OUT READOUT (4-20mA)
ACTUATOR SIGNAL (0-180mA)
OVERLOAD
MINOR ALARM
MAJOR ALARM
RUN/STOP
FUEL LOAD INDICATOR SIGNAL (4-20mA)
PRESET SPEED
KAMEWA SYSTEM FAILURE
SPEED SETTING SIGNAL (4-20mA)
No1.SPEED SIGNAL
No2.SPEED SIGNAL
PROP. PITCH SIGNAL (4-20mA)
ENABLE START FUEL LIMITER
SHIFT FUEL LIMITER
DISABLE TORQUE LIMITER
MANIFOLD PRESS. SIGNAL (4-20mA)
FAULT RESET
MODE INDICATE SWITCH
TO LCD DISPLAY
ADD
DROOP
SPEED REFERENCE RAMP
RAISE
LOWER
PRESET SPEED
DEADBAND
FB
CMD
ENBL
PID
ANALOG COMPARE
DELAY TIMER
FINAL DRIVER
MINIMUM FUEL DURING START ENBL
PROPELLER LAW CONTROL TRANSFER
DYNAMICS MAP
TORQUE LIMIT
MANIFOLD FUEL LIMIT
SPEED FILTER
OFF DELAY TIMER
A/D
FAULT DETECTOR
HSS_BUS
LSS_BUS
"MAX FUEL LEVEL"
"START FUEL LIMIT"
"SHIFT LEVEL"
"SIGNAL SELECT"
"MINIMUM FUEL LEVEL"
"RESET"
"SPEED SET OFFSET"
"100"
"0"

# Chapter 4.
# Control Wiring Diagram

| REVISION HISTORY | | | |
|---|---|---|---|
| REV | DESCRIPTION | DATE | APPROVED |
| NEW | E/C 1149393 | May2011 | ESPLIN |
| | | | |
| | | | |

# CONTROL WIRING DIAGRAM

## SYSTEM 8280-1143

## AtlasSC Digital Marine Control

## 537 Retrofit
## 8262-002 and 8262-055

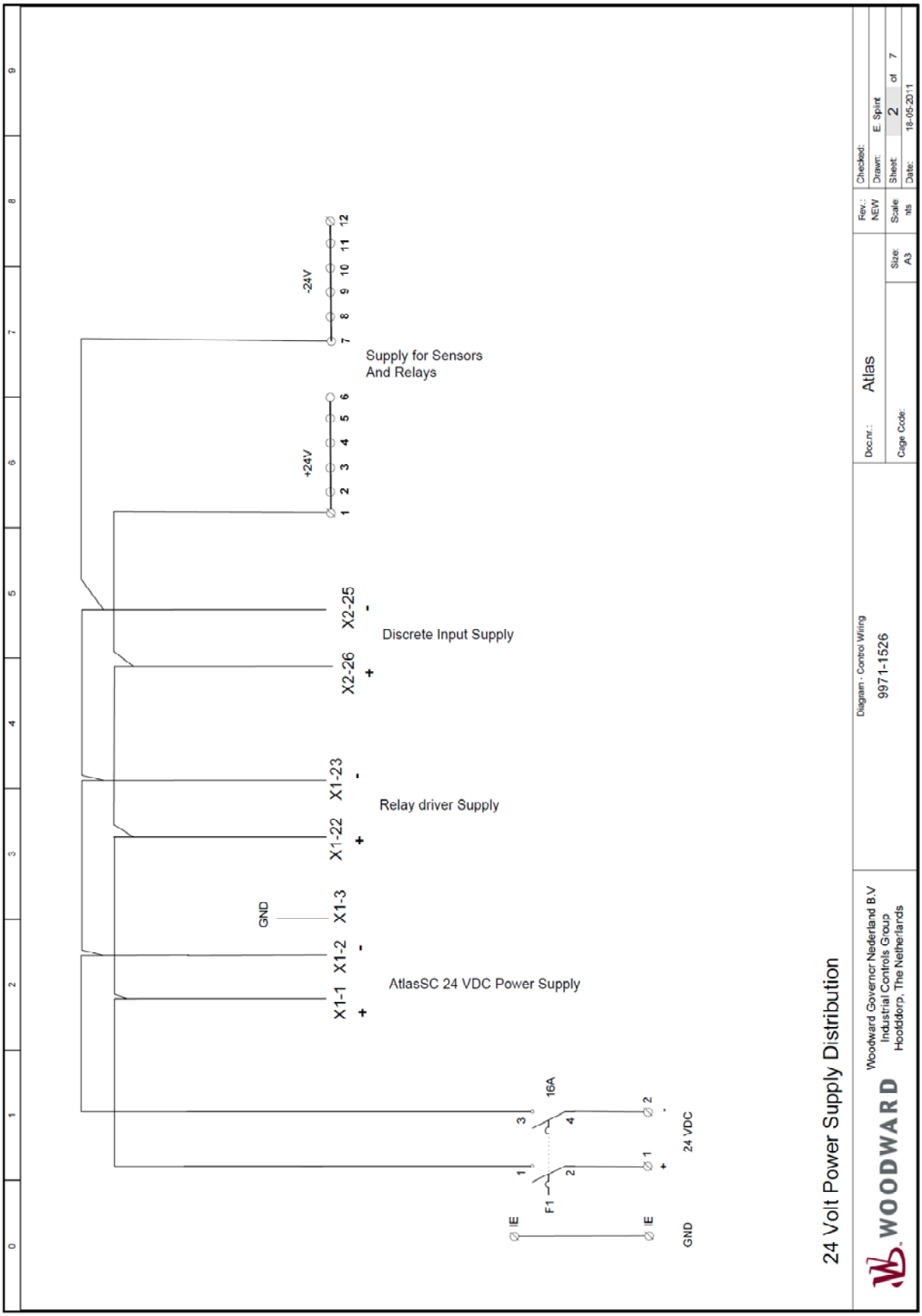
Index

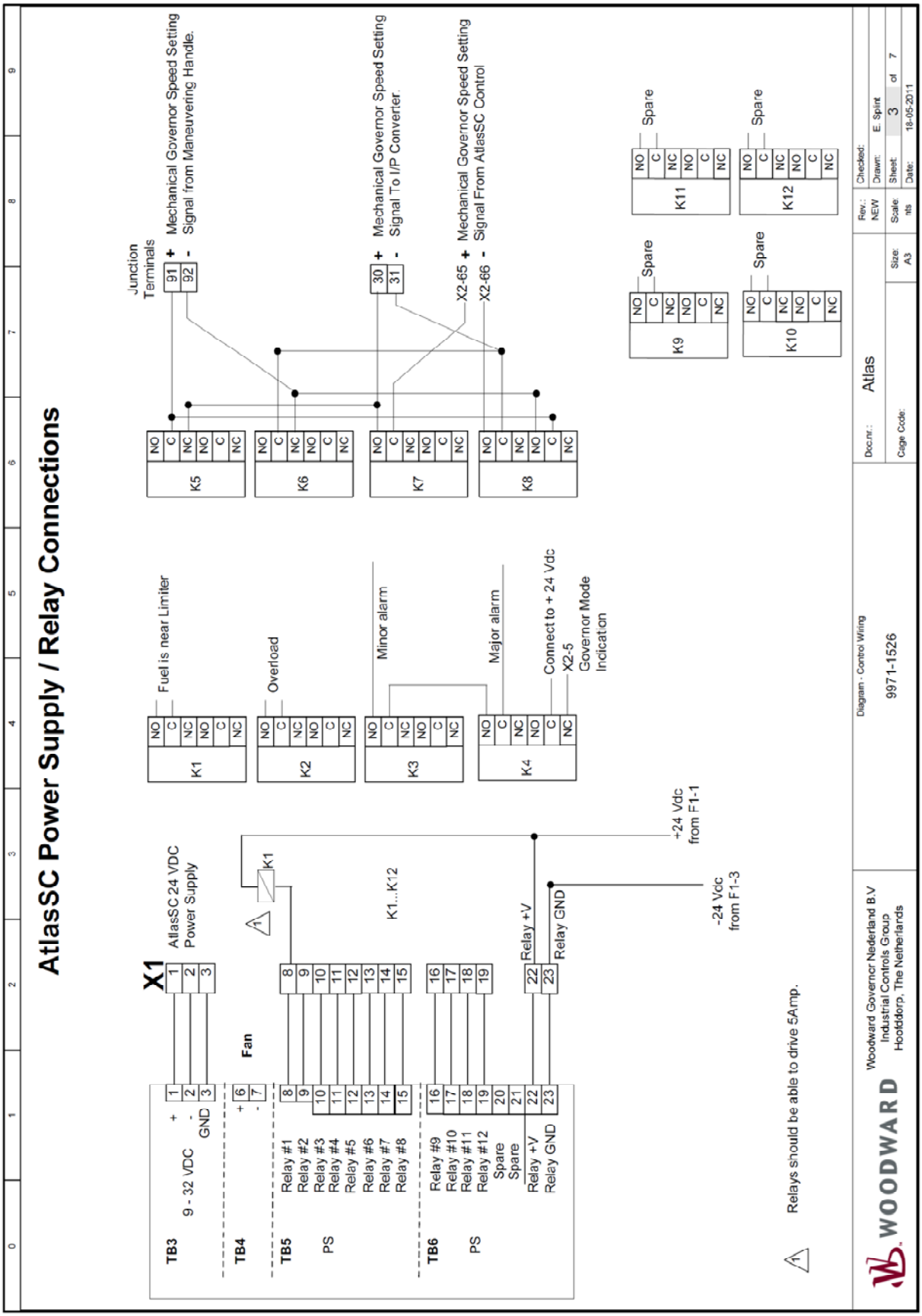


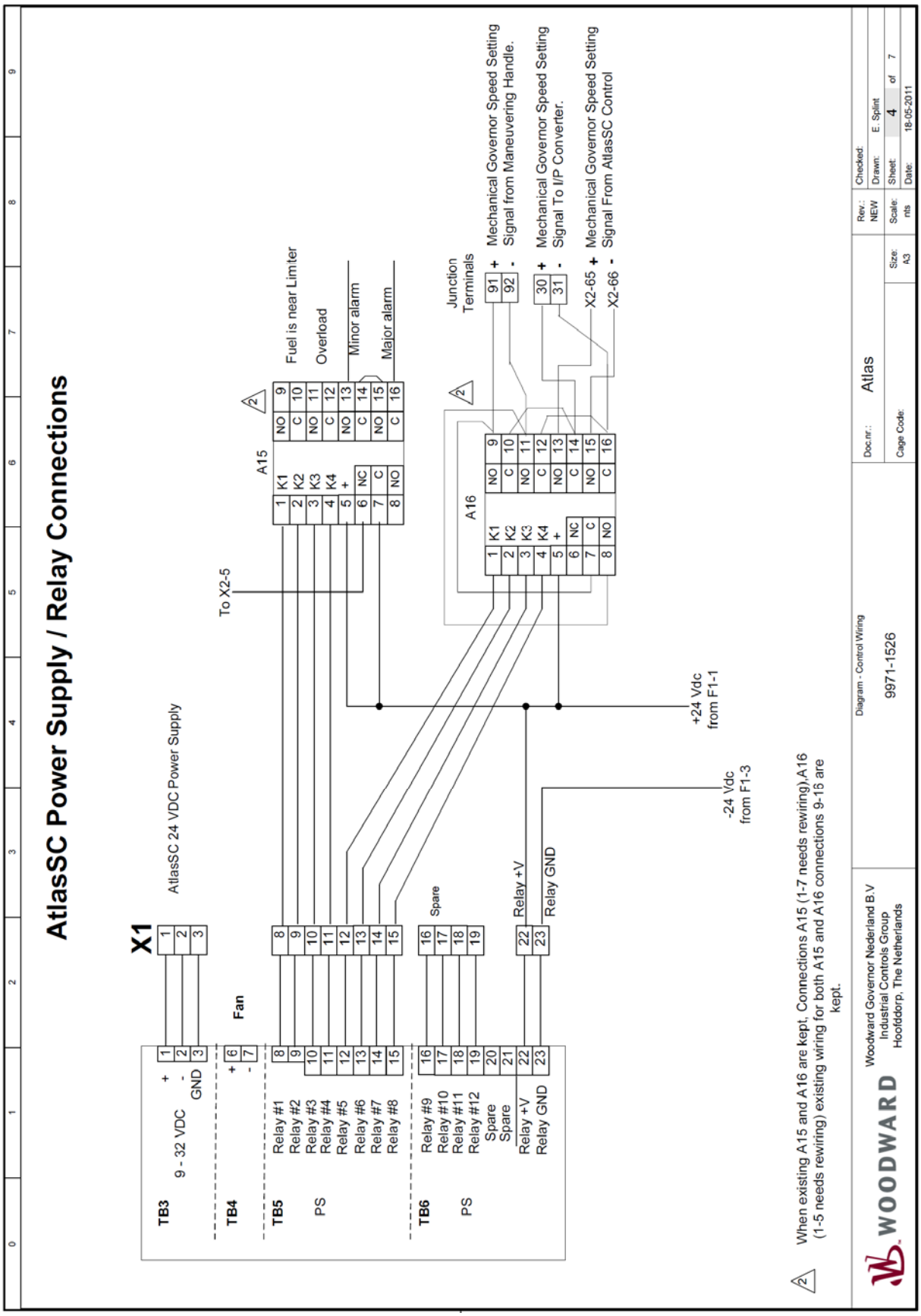

WOODWARD
Woodward Governor Nederland B.V
Industrial Controls Group
Hoofddorp, The Netherlands

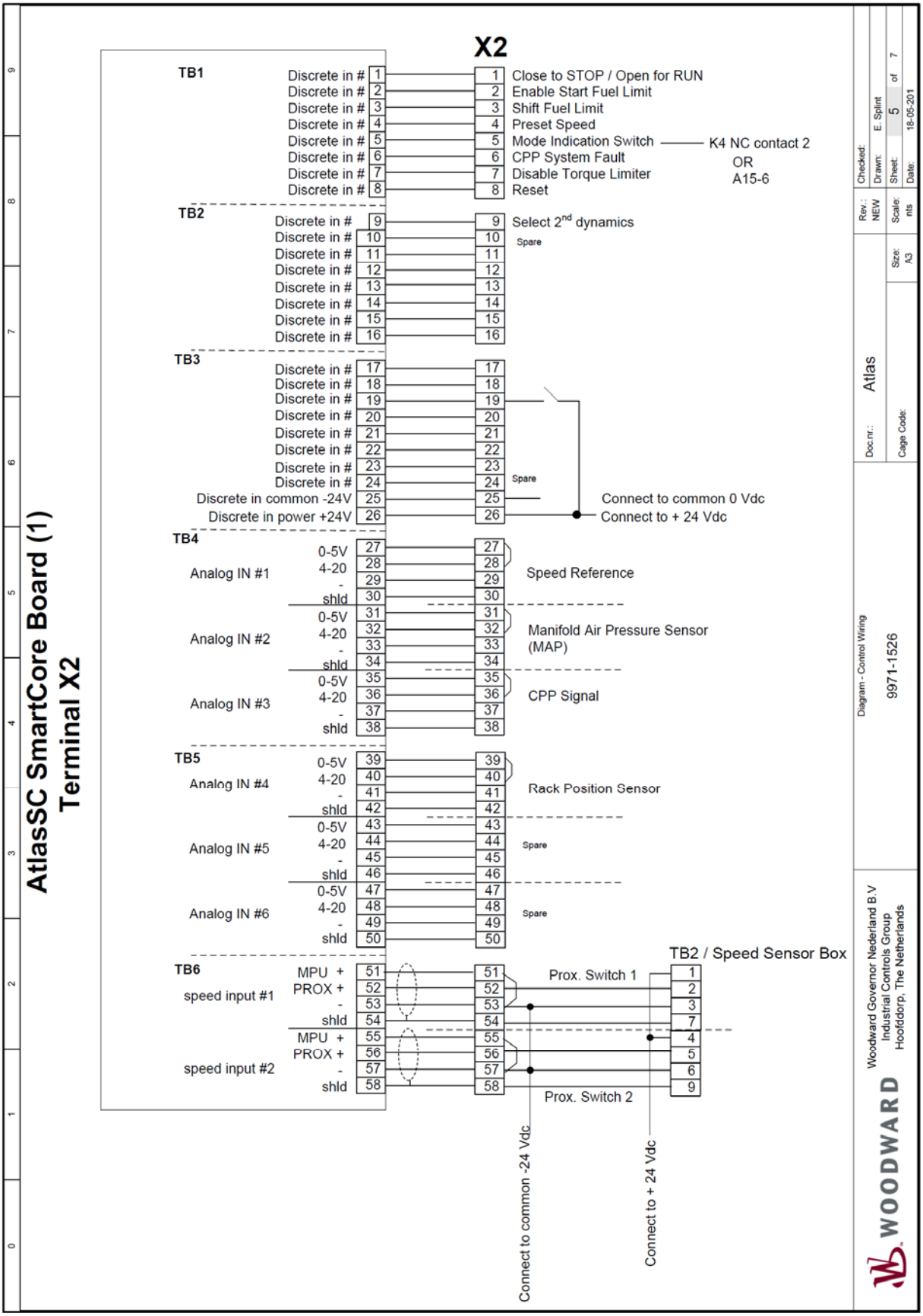

Diagram - Control Wiring
9971-1526

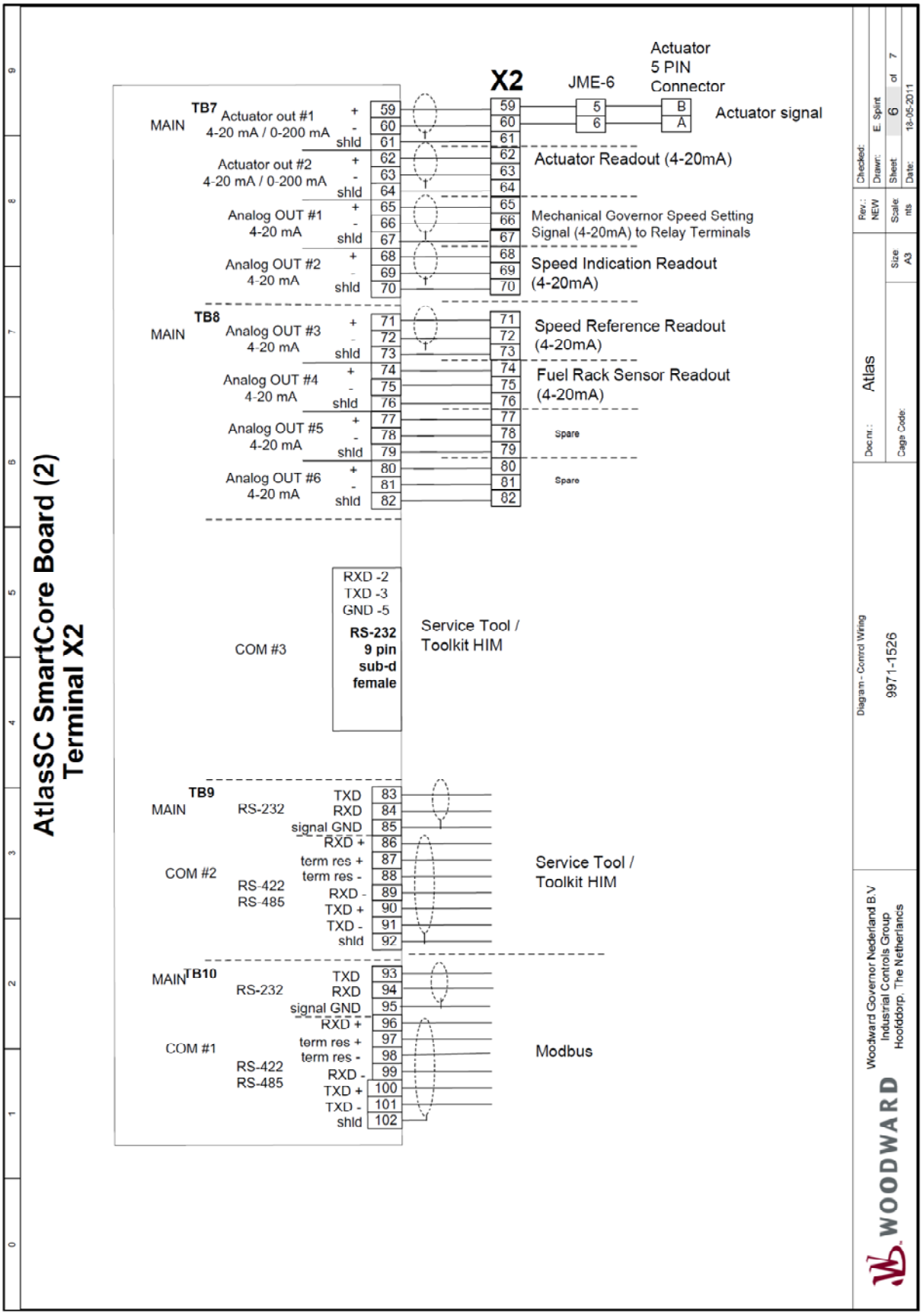
Doc.nr.: AtlasSC
Rev.: NEW
Cage Code:
Size: A3
Scale: nts
Checked:
Drawn: E. Splint
Sheet: 1 of 7
Date: 30-05-2011


24 Volt Power Supply Distribution
WOODWARD
Woodward Governor Nederland B.V
Industrial Controls Group
Hoofddorp, The Netherlands
Diagram - Control Wiring
9971-1526
Doc.nr.: Atlas
Cage Code:
Size: A3
Rev.: NEW
Scale: nts
Checked:
Drawn: E. Spint
Sheet: 2 of 7
Date: 18-05-2011
-24V
+24V
Supply for Sensors
And Relays
X2-25
X2-26
Discrete Input Supply
X1-23
X1-22
Relay driver Supply
GND
X1-3
X1-2
X1-1
AtlasSC 24 VDC Power Supply
16A
F1
24 VDC
GND


AtlasSC Power Supply / Relay Connections
Junction Terminals
91 + Mechanical Governor Speed Setting
92 - Signal from Maneuvering Handle.
30 + Mechanical Governor Speed Setting
31 - Signal To I/P Converter.
X2-65 + Mechanical Governor Speed Setting
X2-66 - Signal From AtlasSC Control
K1 Fuel is near Limiter
K2 Overload
K3 Minor alarm
K4 Major alarm
Connect to + 24 Vdc
X2-5
Governor Mode Indication
K5
K6
K7
K8
K9 Spare
K10 Spare
K11 Spare
K12 Spare
X1
AtlasSC 24 VDC Power Supply
TB3
9 - 32 VDC
+
-
GND
TB4
Fan
+
-
TB5
PS
Relay #1
Relay #2
Relay #3
Relay #4
Relay #5
Relay #6
Relay #7
Relay #8
K1...K12
TB6
PS
Relay #9
Relay #10
Relay #11
Relay #12
Spare
Spare
Relay +V
Relay GND
+24 Vdc from F1-1
-24 Vdc from F1-3
Relays should be able to drive 5Amp.
WOODWARD
Woodward Governor Nederland B.V
Industrial Controls Group
Hoofddorp, The Netherlands
Diagram - Control Wiring
9971-1526
Doc.nr.: Atlas
Cage Code:
Size: A3
Rev.: NEW
Scale: nts
Checked:
Drawn: E. Spint
Sheet: 3 of 7
Date: 18-05-2011


AtlasSC Power Supply / Relay Connections
X1
AtlasSC 24 VDC Power Supply
TB3
9 - 32 VDC
+
-
GND
TB4
Fan
+
-
TB5
PS
Relay #1
Relay #2
Relay #3
Relay #4
Relay #5
Relay #6
Relay #7
Relay #8
TB6
PS
Relay #9
Relay #10
Relay #11
Relay #12
Spare
Spare
Relay +V
Relay GND
Spare
Relay +V
Relay GND
To X2-5
A15
K1
K2
K3
K4
+
NC
C
NO
Fuel is near Limiter
Overload
Minor alarm
Major alarm
A16
Junction Terminals
91 +
92 -
Mechanical Governor Speed Setting
Signal from Maneuvering Handle.
30 +
31 -
Mechanical Governor Speed Setting
Signal To I/P Converter.
X2-65 +
X2-66 -
Mechanical Governor Speed Setting
Signal From AtlasSC Control
+24 Vdc
from F1-1
-24 Vdc
from F1-3
When existing A15 and A16 are kept, Connections A15 (1-7 needs rewiring),A16
(1-5 needs rewiring) existing wiring for both A15 and A16 connections 9-16 are
kept.
WOODWARD
Woodward Governor Nederland B.V
Industrial Controls Group
Hoofddorp, The Netherlands
Diagram - Control Wiring
9971-1526
Doc.nr.: Atlas
Cage Code:
Size: A3
Rev.: NEW
Scale: nts
Checked:
Drawn: E. Splint
Sheet: 4 of 7
Date: 18-05-2011


AtlasSC SmartCore Board (1)
Terminal X2
X2
TB1
Discrete in # 1
Discrete in # 2
Discrete in # 3
Discrete in # 4
Discrete in # 5
Discrete in # 6
Discrete in # 7
Discrete in # 8
1 Close to STOP / Open for RUN
2 Enable Start Fuel Limit
3 Shift Fuel Limit
4 Preset Speed
5 Mode Indication Switch
6 CPP System Fault
7 Disable Torque Limiter
8 Reset
K4 NC contact 2
OR
A15-6
TB2
Discrete in # 9
Discrete in # 10
Discrete in # 11
Discrete in # 12
Discrete in # 13
Discrete in # 14
Discrete in # 15
Discrete in # 16
9 Select 2nd dynamics
10 Spare
TB3
Discrete in # 17
Discrete in # 18
Discrete in # 19
Discrete in # 20
Discrete in # 21
Discrete in # 22
Discrete in # 23
Discrete in # 24
Discrete in common -24V 25
Discrete in power +24V 26
Spare
Connect to common 0 Vdc
Connect to + 24 Vdc
TB4
Analog IN #1 0-5V 27 4-20 28 - 29 shld 30
Analog IN #2 0-5V 31 4-20 32 - 33 shld 34
Analog IN #3 0-5V 35 4-20 36 - 37 shld 38
Speed Reference
Manifold Air Pressure Sensor (MAP)
CPP Signal
TB5
Analog IN #4 0-5V 39 4-20 40 - 41 shld 42
Analog IN #5 0-5V 43 4-20 44 - 45 shld 46
Analog IN #6 0-5V 47 4-20 48 - 49 shld 50
Rack Position Sensor
Spare
Spare
TB2 / Speed Sensor Box
TB6
speed input #1 MPU + 51 PROX + 52 - 53 shld 54
speed input #2 MPU + 55 PROX + 56 - 57 shld 58
Prox. Switch 1
Prox. Switch 2
Connect to common -24 Vdc
Connect to + 24 Vdc
Checked:
Drawn: E. Splint
Sheet: 5 of 7
Date: 18-05-201
Rev.: NEW
Scale: nts
Size: A3
Doc.nr.: Atlas
Cage Code:
Diagram - Control Wiring
9971-1526
WOODWARD
Woodward Governor Nederland B.V
Industrial Controls Group
Hoofddorp, The Netherlands


AtlasSC SmartCore Board (2)
Terminal X2
X2
JME-6
Actuator
5 PIN
Connector
Actuator signal
TB7
MAIN
Actuator out #1
4-20 mA / 0-200 mA
Actuator out #2
4-20 mA / 0-200 mA
Analog OUT #1
4-20 mA
Analog OUT #2
4-20 mA
Actuator Readout (4-20mA)
Mechanical Governor Speed Setting
Signal (4-20mA) to Relay Terminals
Speed Indication Readout
(4-20mA)
TB8
MAIN
Analog OUT #3
4-20 mA
Analog OUT #4
4-20 mA
Analog OUT #5
4-20 mA
Analog OUT #6
4-20 mA
Speed Reference Readout
(4-20mA)
Fuel Rack Sensor Readout
(4-20mA)
Spare
Spare
COM #3
RXD -2
TXD -3
GND -5
RS-232
9 pin
sub-d
female
Service Tool /
Toolkit HIM
TB9
MAIN
COM #2
RS-232
RS-422
RS-485
Service Tool /
Toolkit HIM
TB10
MAIN
COM #1
RS-232
RS-422
RS-485
Modbus
Woodward Governor Nederland B.V.
Industrial Controls Group
Hoofddorp, The Netherlands
WOODWARD
Diagram - Control Wiring
9971-1526
Atlas

| AtlasSC connection | 537 | Junction Terminals | Remark |
|---|---|---|---|
| X1-1 | TB9-19 | P | (+24Vdc) |
| X1-2 | TB9-20 | N | (-24Vdc) |
| X1-3 | GND | | |
| | | | |
| X1-8 | TB5-30 | A15-1 | Relays |
| X1-9 | TB5-29 | A15-2 | |
| X1-10 | TB5-28 | A15-3 | |
| X1-11 | TB5-27 | A15-4 | |
| X1-12 | TB5-26 | A16-1 | |
| X1-13 | TB5-25 | A16-2 | |
| X1-14 | TB5-24 | A16-3 | |
| X1-15 | TB5-23 | A16-4 | |
| | | | |
| X1-22 | TB5-22 | | (+24Vdc) |
| X1-23 | | | (-24Vdc) |
| | | | |
| X2-1 | TB5-1 | | Discrete Input |
| X2-2 | TB5-2 | | |
| X2-3 | TB5-3 | | |
| X2-4 | TB5-4 | | |
| X2-5 | TB5-5 | | |
| X2-6 | TB5-6 | | |
| X2-7 | TB5-7 | | |
| X2-8 | TB5-17 | | |
| X2-9 | TB5-18 | | |
| | | | |
| X2-25 | | | (-24Vdc) |
| X2-26 | TB5-20 | | (+24Vdc) |
| | | | |
| X2-27 | TB4-1 | 88 or xx | Analog Inputs |
| X2-28 | TB4-1 | 87 or xx | |
| X2-29 | TB4-2 | | |
| X2-30 | TB4-3 | | shield |
| X2-31 | TB4-4 | 45 or 39 | |
| X2-32 | TB4-4 | | |
| X2-33 | TB4-5 | | |
| X2-34 | TB4-6 | | shield |
| X2-35 | TB4-7 | | |
| X2-36 | TB4-7 | 31 or xx | |
| X2-37 | TB4-8 | 32 or xx | |
| X2-38 | TB4-9 | | shield |
| X2-39 | TB4-10 | | |
| X2-40 | TB4-10 | 78 or 72 | |
| X2-41 | TB4-11 | 79 or 73 | |
| X2-42 | TB4-12 | | shield |

| AtlasSC connection | 537 | Junction Terminals | Remark |
|---|---|---|---|
| X2-51 | (-24Vdc) | | Speed Sensors |
| X2-52 | TB2-2 | PNP | Check manual 26179 for proper |
| X2-53 | (-24Vdc) | | connections. |
| X2-54 | TB2-7 | | shield |
| X2-55 | (-24Vdc) | | |
| X2-56 | TB2-5 | PNP | |
| X2-57 | (-24Vdc) | | |
| X2-58 | TB2-9 | | shield |
| | | | |
| | | | Actuator / Analog Outputs |
| X2-59 | TB2-10 | JME6-5 | B |
| X2-60 | TB2-11 | JME6-6 | A |
| X2-61 | TB2-12 | | shield |
| X2-62 | TB7-1 | 13 | |
| X2-63 | TB7-2 | 14 | |
| X2-64 | TB7-3 | | shield |
| X2-65 | TB7-4 | to Relays | |
| X2-66 | TB7-5 | to Relays | |
| X2-67 | TB7-6 | | shield |

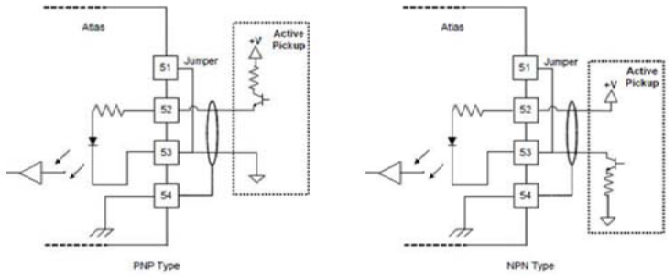



Figure 4-4. Proximity Probe to the SmartCore Board (wiring example)

Check with manual 26179 in chapter 4; The proper connections for the speed sensors.

| | | | | | |
|---|---|---|---|---|---|
| WOODWARD | Woodward Governor Nederland B.V<br>Industrial Controls Group<br>Hoofddorp, The Netherlands | Diagram - Control Wiring<br>9971-1526 | Doc.nr.: Atlas<br>Cage Code: | Size: A3 | Rev.: NEW<br>Scale: nts |
| | | | | | Checked:<br>Drawn: E. Splint<br>Sheet: 7 of 7<br>Date: 18-05-2011 |

# Chapter 5.
# Service Options

## Product Service Options

If you are experiencing problems with the installation, or unsatisfactory performance of a Woodward product, the following options are available:

- Consult the troubleshooting guide in the manual.
- Contact the manufacturer or packager of your system.
- Contact the Woodward Full Service Distributor serving your area.
- Contact Woodward technical assistance (see "How to Contact Woodward" later in this chapter) and discuss your problem. In many cases, your problem can be resolved over the phone. If not, you can select which course of action to pursue based on the available services listed in this chapter.

**OEM and Packager Support:** Many Woodward controls and control devices are installed into the equipment system and programmed by an Original Equipment Manufacturer (OEM) or Equipment Packager at their factory. In some cases, the programming is password-protected by the OEM or packager, and they are the best source for product service and support. Warranty service for Woodward products shipped with an equipment system should also be handled through the OEM or Packager. Please review your equipment system documentation for details.

**Woodward Business Partner Support:** Woodward works with and supports a global network of independent business partners whose mission is to serve the users of Woodward controls, as described here:

- A **Full Service Distributor** has the primary responsibility for sales, service, system integration solutions, technical desk support, and aftermarket marketing of standard Woodward products within a specific geographic area and market segment.
- An **Authorized Independent Service Facility (AISF)** provides authorized service that includes repairs, repair parts, and warranty service on Woodward's behalf. Service (not new unit sales) is an AISF's primary mission.
- A **Recognized Engine Retrofitter (RER)** is an independent company that does retrofits and upgrades on reciprocating gas engines and dual-fuel conversions, and can provide the full line of Woodward systems and components for the retrofits and overhauls, emission compliance upgrades, long term service contracts, emergency repairs, etc.
- A **Recognized Turbine Retrofitter (RTR)** is an independent company that does both steam and gas turbine control retrofits and upgrades globally, and can provide the full line of Woodward systems and components for the retrofits and overhauls, long term service contracts, emergency repairs, etc.

You can locate your nearest Woodward distributor, AISF, RER, or RTR on our website at:

**www.woodward.com/directory**

## Woodward Factory Servicing Options

The following factory options for servicing Woodward products are available through your local Full-Service Distributor or the OEM or Packager of the equipment system, based on the standard Woodward Product and Service Warranty (5-01-1205) that is in effect at the time the product is originally shipped from Woodward or a service is performed:

- Replacement/Exchange (24-hour service)
- Flat Rate Repair
- Flat Rate Remanufacture

**Replacement/Exchange:** Replacement/Exchange is a premium program designed for the user who is in need of immediate service. It allows you to request and receive a like-new replacement unit in minimum time (usually within 24 hours of the request), providing a suitable unit is available at the time of the request, thereby minimizing costly downtime. This is a flat-rate program and includes the full standard Woodward product warranty (Woodward Product and Service Warranty 5-01-1205).

This option allows you to call your Full-Service Distributor in the event of an unexpected outage, or in advance of a scheduled outage, to request a replacement control unit. If the unit is available at the time of the call, it can usually be shipped out within 24 hours. You replace your field control unit with the like-new replacement and return the field unit to the Full-Service Distributor.

Charges for the Replacement/Exchange service are based on a flat rate plus shipping expenses. You are invoiced the flat rate replacement/exchange charge plus a core charge at the time the replacement unit is shipped. If the core (field unit) is returned within 60 days, a credit for the core charge will be issued.

**Flat Rate Repair:** Flat Rate Repair is available for the majority of standard products in the field. This program offers you repair service for your products with the advantage of knowing in advance what the cost will be. All repair work carries the standard Woodward service warranty (Woodward Product and Service Warranty 5-01-1205) on replaced parts and labor.

**Flat Rate Remanufacture:** Flat Rate Remanufacture is very similar to the Flat Rate Repair option with the exception that the unit will be returned to you in “like-new” condition and carry with it the full standard Woodward product warranty (Woodward Product and Service Warranty 5-01-1205). This option is applicable to mechanical products only.

## Returning Equipment for Repair

If a control (or any part of an electronic control) is to be returned for repair, please contact your Full-Service Distributor in advance to obtain Return Authorization and shipping instructions.

When shipping the item(s), attach a tag with the following information:

- return authorization number;
- name and location where the control is installed;
- name and phone number of contact person;
- complete Woodward part number(s) and serial number(s);
- description of the problem;
- instructions describing the desired type of repair.

### Packing a Control

Use the following materials when returning a complete control:

- protective caps on any connectors;
- antistatic protective bags on all electronic modules;
- packing materials that will not damage the surface of the unit;
- at least 100 mm (4 inches) of tightly packed, industry-approved packing material;
- a packing carton with double walls;
- a strong tape around the outside of the carton for increased strength.

**NOTICE**

**To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual 82715, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.**

## Replacement Parts

When ordering replacement parts for controls, include the following information:

- the part number(s) (XXXX-XXXX) that is on the enclosure nameplate;
- the unit serial number, which is also on the nameplate.

## Engineering Services

Woodward offers various Engineering Services for our products. For these services, you can contact us by telephone, by email, or through the Woodward website.

- Technical Support
- Product Training
- Field Service

**Technical Support** is available from your equipment system supplier, your local Full-Service Distributor, or from many of Woodward's worldwide locations, depending upon the product and application. This service can assist you with technical questions or problem solving during the normal business hours of the Woodward location you contact. Emergency assistance is also available during non-business hours by phoning Woodward and stating the urgency of your problem.

**Product Training** is available as standard classes at many of our worldwide locations. We also offer customized classes, which can be tailored to your needs and can be held at one of our locations or at your site. This training, conducted by experienced personnel, will assure that you will be able to maintain system reliability and availability.

**Field Service** engineering on-site support is available, depending on the product and location, from many of our worldwide locations or from one of our Full-Service Distributors. The field engineers are experienced both on Woodward products as well as on much of the non-Woodward equipment with which our products interface.

For information on these services, please contact us via telephone, email us, or use our website: **www.woodward.com**.

# How to Contact Woodward

For assistance, call one of the following Woodward facilities to obtain the address and phone number of the facility nearest your location where you will be able to get information and service.

### Electrical Power Systems

| Facility | Phone Number |
|---|---|
| Brazil | +55 (19) 3708 4800 |
| China | +86 (512) 6762 6727 |
| Germany | +49 (0) 21 52 14 51 |
| India | +91 (129) 4097100 |
| Japan | +81 (43) 213-2191 |
| Korea | +82 (51) 636-7080 |
| Poland | +48 12 295 13 00 |
| United States | +1 (970) 482-5811 |

### Engine Systems

| Facility | Phone Number |
|---|---|
| Brazil | +55 (19) 3708 4800 |
| China | +86 (512) 6762 6727 |
| Germany | +49 (711) 78954-510 |
| India | +91 (129) 4097100 |
| Japan | +81 (43) 213-2191 |
| Korea | +82 (51) 636-7080 |
| The Netherlands | +31 (23) 5661111 |
| United States | +1 (970) 482-5811 |

### Turbine Systems

| Facility | Phone Number |
|---|---|
| Brazil | +55 (19) 3708 4800 |
| China | +86 (512) 6762 6727 |
| India | +91 (129) 4097100 |
| Japan | +81 (43) 213-2191 |
| Korea | +82 (51) 636-7080 |
| The Netherlands | +31 (23) 5661111 |
| Poland | +48 12 295 13 00 |
| United States | +1 (970) 482-5811 |

You can also locate your nearest Woodward distributor or service facility on our website at:

**www.woodward.com/directory**

# Technical Assistance

If you need to telephone for technical assistance, you will need to provide the following information. Please write it down here before phoning:

| | |
|---|---|
| Your Name | |
| Site Location | |
| Phone Number | |
| Fax Number | |
| Engine/Turbine Model Number | |
| Manufacturer | |
| Number of Cylinders (if applicable) | |
| Type of Fuel (gas, gaseous, steam, etc) | |
| Rating | |
| Application | |
| **Control/Governor #1** | |
| Woodward Part Number & Rev. Letter | |
| Control Description or Governor Type | |
| Serial Number | |
| **Control/Governor #2** | |
| Woodward Part Number & Rev. Letter | |
| Control Description or Governor Type | |
| Serial Number | |
| **Control/Governor #3** | |
| Woodward Part Number & Rev. Letter | |
| Control Description or Governor Type | |
| Serial Number | |

*If you have an electronic or programmable control, please have the adjustment setting positions or the menu settings written down and with you at the time of the call.*

**We appreciate your comments about the content of our publications.**

**Send comments to: icinfo@woodward.com**

**Please reference publication 26609.**

WOODWARD

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**Email and Website—www.woodward.com**

**Woodward has company-owned plants, subsidiaries, and branches,
as well as authorized distributors and other authorized service and sales facilities throughout the world.**

**Complete address / phone / fax / email information for all locations is available on our website.**

2013/1/Colorado