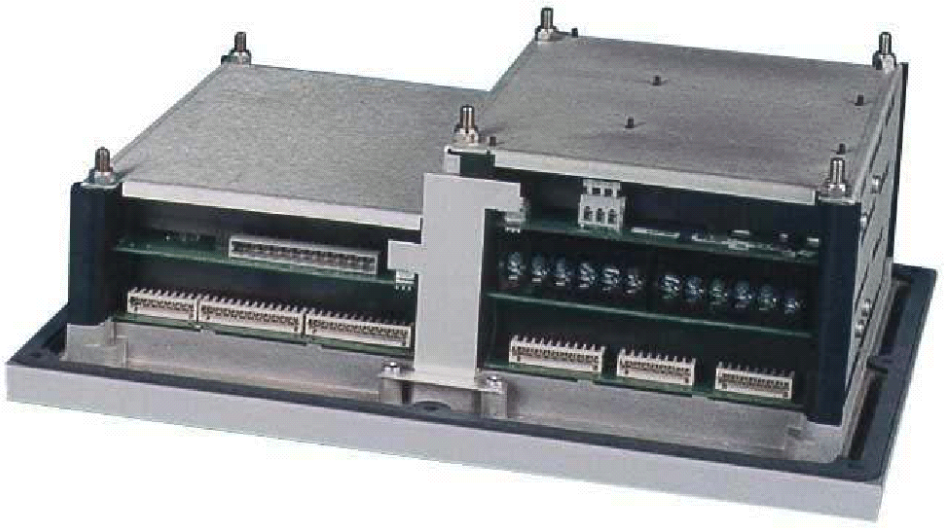
WOODWARD

Installation and Operation manual



AtlasSC

Overspeed Protection System

System Number: 8262-770

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Manual 26229 (Revision A)

WARNING—DANGER OF DEATH OR PERSONAL INJURY

WARNING—FOLLOW INSTRUCTIONS

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.

WARNING—OUT-OF-DATE PUBLICATION

This publication may have been revised or updated since this copy was produced. To verify that you have the latest revision, be sure to check the Woodward website:

www.woodward.com/pubs/current.pdf

The revision level is shown at the bottom of the front cover after the publication number. The latest version of most publications is available at:

www.woodward.com/publications

If your publication is not there, please contact your customer service representative to get the latest copy.

WARNING—OVERSPEED PROTECTION

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—PROPER USE

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.

CAUTION—POSSIBLE DAMAGE TO EQUIPMENT OR PROPERTY

CAUTION—BATTERY CHARGING

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.

CAUTION—ELECTROSTATIC DISCHARGE

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.**

IMPORTANT DEFINITIONS

- **A WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.**
- **A CAUTION indicates a potentially hazardous situation which, if not avoided, could result in damage to equipment or property.**
- **A NOTE provides other helpful information that does not fall under the warning or caution categories.**

Revisions—Text changes are indicated by a black line alongside the text.

WARNING—THIS PUBLICATION MAY BE OUT OF DATE
The Japanese original of this publication may have been updated since this translation was made. For the most current information, be sure to check whether there is a Japanese version with a later revision.

Quick Reference Guide

Figures:

Contents

Illustrations

Chapter 1
General Information

Introduction

This manual describes Woodward's AtlasSC™ Overspeed Protection System (Woodward System Number: 8262-770). The manual explains the installation, operation and give the configuration procedures for the system. This manual does not contain instructions for the operation of the complete turbine system. For turbine- or plant-operating instructions, contact the plant-equipment manufacturer.

Before doing any installation, maintenance, adjustments, or configuration on the AtlasSC Overspeed Protection System, read manual 82715, Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards and Control modules.

Application

The AtlasSC Overspeed Protection System is a digital overspeed trip device that senses prime mover speed through two magnetic pickups (MPUs). The speed signal sensing circuit in the device automatically passes the higher of the two signals and blocks the lower signal. The AtlasSC Overspeed Protection System continuously monitor the prime mover speed and de-energize a trip relay when an overspeed is detected or both speed signals failed.

Accessories

Use EMI Filter (Woodward P/N 1755-199) to eliminate power line noise. See Figure 1-2 for the EMI Filter outline.

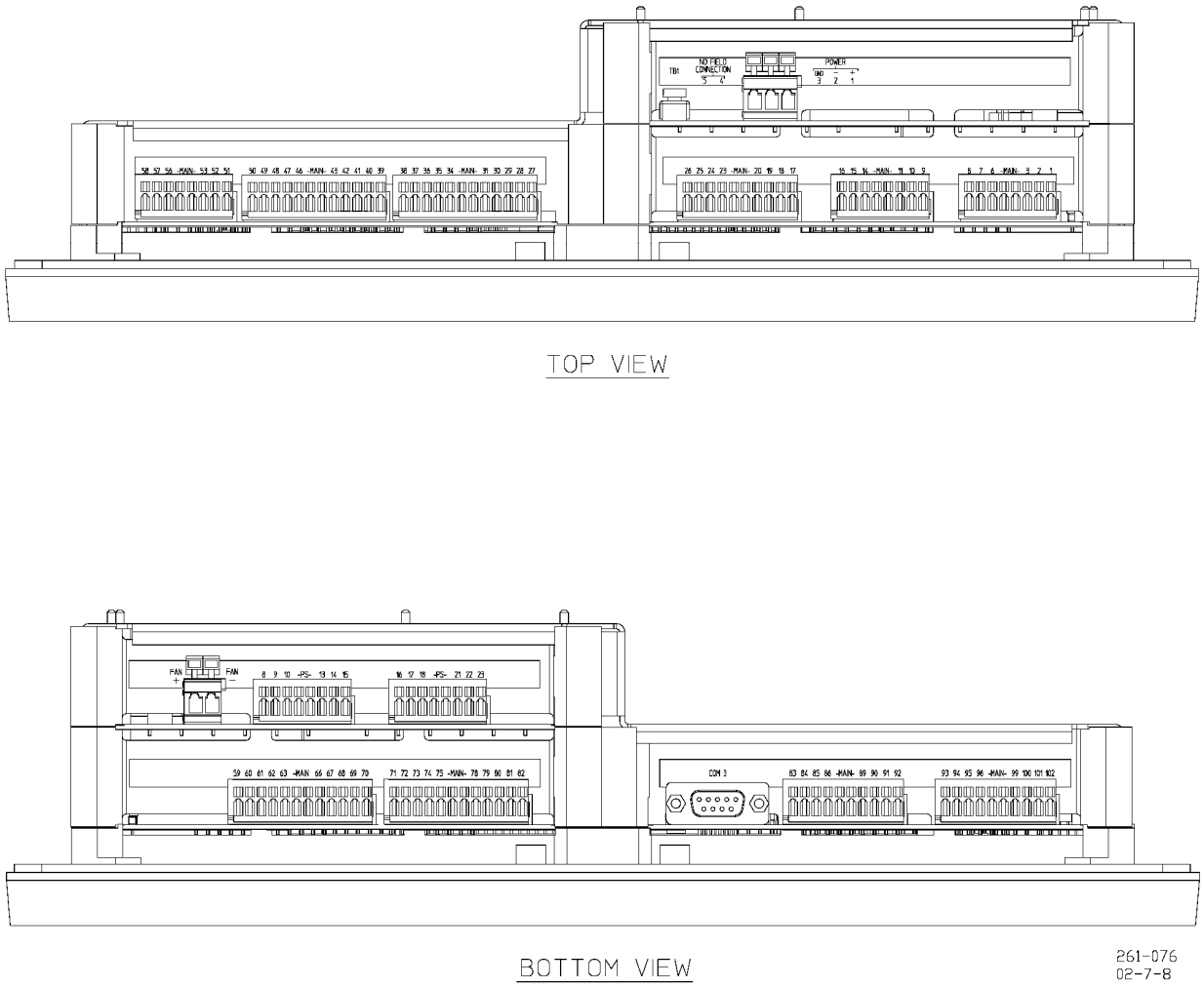


Figure 1-1. AtlasSC

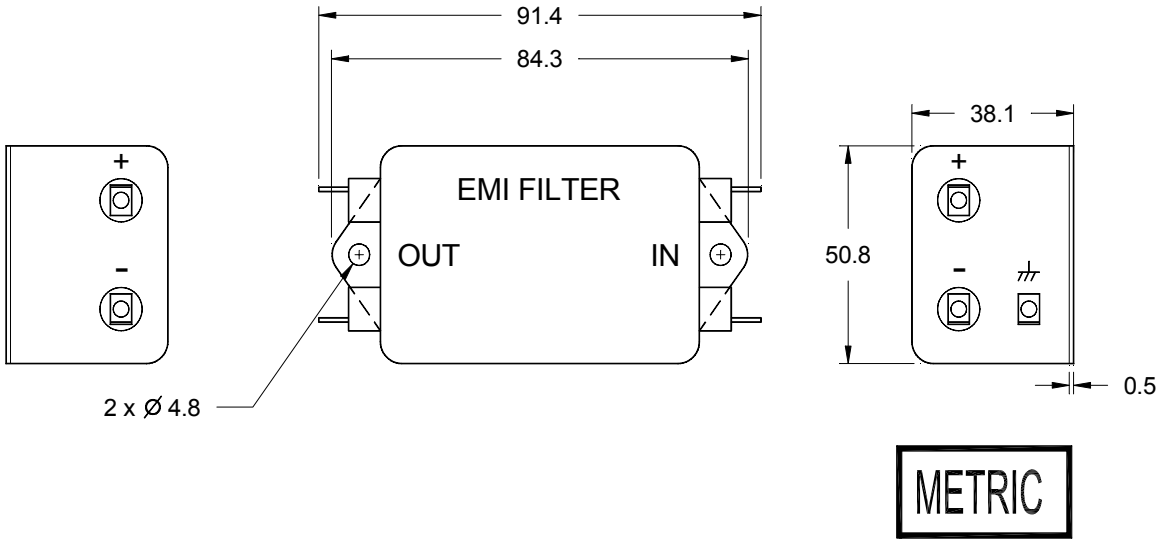


Figure 1-2. EMI Filter (Option)

Chapter 2
Electrostatic Discharge Awareness

All electronic equipment is static-sensitive, some components more than others. To protect these components from static damage, you must take special precautions to minimize or eliminate electrostatic discharges.

Follow these precautions when working with or near the equipment.

1. Before doing maintenance on the electronic equipment, discharge the static electricity on your body to ground by touching and holding a grounded metal object (pipes, cabinets, equipment, etc.).

2. 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.

3. Keep plastic, vinyl, and styrofoam materials (such as plastic or styrofoam cups, cup holders, cigarette packages, cellophane wrappers, vinyl books or folders, plastic bottles, and plastic ash trays) away from the equipment, the modules, and the work area as much as possible.

4. Do not remove the printed circuit board (PCB) from the equipment cabinet unless absolutely necessary. If you must remove the PCB from the equipment 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 equipment cabinet, place it in the antistatic protective bag.

CAUTION—ELECTROSTATIC DISCHARGE
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*.

Chapter 3
Installation

Introduction

This chapter contains general installation instructions for the AtlasSC™ Overspeed Protection System (Woodward P/N 8262-770). Power requirements, environmental precautions, and location considerations are included to help you determine the best location for the device. Additional information includes unpacking instructions, electrical connections, and installation checkout procedures.

Unpacking

Before handling the AtlasSC control, read Chapter 2, Electrostatic Discharge Awareness. Be careful when unpacking the electronic control. Check the control for signs of damage such as bent panels, scratches, and loose or broken parts. If any damage is found, immediately notify the shipper.

Location Considerations

Consider these requirements when selecting the mounting location:

- adequate ventilation for cooling;
- space for servicing and repair;
- protection from direct exposure to water or to a condensation-prone environment;
- protection from high-voltage or high-current devices, or devices which produce electromagnetic interference;
- avoidance of vibration;
- selection of a location that will provide an operating temperature range of –20 to +70 °C (–4 to +158 °F).

Refer Woodward manual 26179: AtlasSC Digital Control Hardware/Software manual for details of AtlasSC Control’s specification.

Electrical Connections

External wiring connections and shielding requirements for a typical AtlasSC control installation are shown on the Wiring drawings 9971-3026 at the end of this manual.

Shielded Wiring

All shielded cable must be twisted conductor pairs. Do not attempt to tin the braided shield. All signal lines should be shielded to prevent picking up stray signals from adjacent equipment. Connect the shields to the nearest chassis ground. Wire exposed beyond the shield should be as short as possible, not exceeding 25 mm (1 inch). The other end of the shields must be left open and insulated from any other conductor. DO NOT run shielded signal wires along with other wires carrying large currents. See Woodward application note 50532, *Interference Control in Electronic Governing Systems* for more information.

Where shielded cable is required, cut the cable to the desired length and prepare the cable as instructed below.

1. Strip outer insulation from BOTH ENDS, exposing the braided or spiral wrapped shield. DO NOT CUT THE SHIELD.

2. Using a sharp, pointed tool, carefully spread the strands of the braided shield.

3. Pull inner conductor(s) out of the shield. If the shield is the braided type, twist it to prevent fraying.

4. Remove 6 mm (1/4 inch) of insulation from the inner conductors.

Installations with severe electromagnetic interference (EMI) may require additional shielding precautions. Contact Woodward Governor Company for more information.

Power Supply (Terminals 1/2)

Supply 18-32 Vdc power to the AtlasSC control (which is used as an Overspeed Trip System). The nominal power supply voltage for this control is 24 Vdc. Connect lines from the power source to the EMI Filter (if it is used), the positive line from the EMI Filter to Terminal 1 of the control, and the common line from the EMI Filter to Terminal 2 of the control. Power must be applied to the AtlasSC control at least 60 seconds prior to expected use. The control must have time to do its power up diagnostics to become operational. Illuminating LED on the Power Supply board indicates that the control is executing self-diagnostics.

CAUTION

To prevent damage to the control, do not exceed the input voltage range.

WARNING

To prevent damage to the control, make sure that the alternator or other battery-charging device is turned off or disconnected before disconnecting the battery from the control.

Run the power leads directly from the power source to the EMI filter. DO NOT POWER OTHER DEVICES WITH LEADS COMMON TO THE CONTROL. Avoid long wire lengths.

WARNING

To prevent damage to the turbine, apply power to the AtlasSC control at least 60 seconds prior to starting the turbine. The control must have time to do its power up diagnostics and become operational. Do not start the turbine unless the red LED on the power supply board is extinguished, because test failure turns off the output of the control.

Relay Outputs (Terminal 8-18 on PS board)

Connect an external 24 Vdc power supply to Terminal 22 (+) on PS board and Terminal 23 (–) to supply relay coil drive current for each relay.

Terminal 8 indicates the status of Trip output. This discrete output is a “normally closed” contact, which is closed while power is supplied to the device and any overspeed trip has not happened. (the relay is energized.) The “closed” state indicates any overspeed trip is inactive.

Terminal 9 is MPU 1 failure alarm indication output. This discrete output is a “normally closed” contact (the relay is energized), which is closed while power is supplied to the device and MPU 1 failure has not happened. The “closed” state indicates MPU 1 failure is inactive.

Terminal 10 is MPU 2 failure alarm indication output. This discrete output is a “normally closed” contact (the relay is energized), which is closed while power is supplied to the device and MPU 2 failure has not happened. The “closed” state indicates MPU 2 failure is inactive.

Terminal 11 to 16 are Speed Switch discrete outputs. These discrete outputs are “normally open” contacts (relays are de-energized), which are opened while power is supplied to the device and the speed is under the specified level.

Terminal 17 is a discrete output to indicate that the speed sensed by MPU 1 is lower than the speed sensed by MPU 2. The discrete output is a “normally closed” contact (the relay is energized), which is closed while power is supplied to the device and the condition described above has not consisted. The “closed” state indicates MPU 1 speed deviation error alarm is inactive.

Terminal 18 is a discrete output to indicate that the speed sensed by MPU 2 is lower than the speed sensed by MPU 1. The discrete output is a “normally closed” contact (the relay is energized), which is closed while power is supplied to the device and the condition described above has not consisted. The “closed” state indicates MPU 2 speed deviation error alarm is inactive.

Tachometer Output (Terminal 65/66, 68/69)

Terminal 65 (+) and 66 (–) are used as Tachometer output A (4-20 mA output), and Terminal 68 (+) and 69 (–) used as Tachometer output B (4-20 mA output). Use shielded twisted pairs for wiring. For an electrically isolated input device such as a 4 to 20 mA input analog meter, the shield should be grounded at the device end of the cable (not at the Atlas control end). For input to other devices, use the recommendation of the device manufacturer.

MPU Speed Output (Terminal 71/72, 74/75)

Terminal 71 (+) and 72 (–) are used as MPU #1 Speed Output (4-20 mA signal) and Terminal 74 (+) and 75 (–) are MPU #2 Speed Output (4-20 mA signal). Use shielded twisted pairs for wiring. For an electrically isolated input device such as a 4 to 20 mA input analog meter, the shield should be grounded at the input device end of the cable. For input to other devices, use the recommendation of the device manufacturer.

Speed Inputs (Terminal 51/53, 55/57)

Connect MPU #1 to Terminal 51 and 53, and connect MPU #2 to Terminal 55 and 57. Use shielded twisted pairs for wiring. The shield should be grounded at the input device end of the cable.

Discrete Inputs (Terminal 1, 2)

Discrete inputs are used for the switch input commands to the AtlasSC control. Discrete inputs are activated if each input circuit is closed to common. Refer the control wiring diagrams attached to the end of this manual for wiring details.

Installation Checkout Procedure

With the installation complete as described in this chapter, do the following checkout procedure before beginning set point entry or initial startup adjustments.

Visual inspection

A. Check for correct wiring in accordance with the control wiring diagram. Wiring diagrams are attached to the end of this manual.

B. Check for broken terminals and loose terminal screws.

C. Check the speed sensor(s) for visible damage. Check the clearance between the gear and the sensor, and adjust if necessary. Clearance should be between 0.25 and 1.25 mm (0.010 and 0.050 inch) at the closest point. Make sure the gear runout does not exceed the pickup gap.

Check for grounds

Check for grounds by measuring the resistance from all control terminals to chassis. All terminals except terminals on PS modules should measure a resistance over 10 megohms (PS:TB3, MAINTB30, 34, 38, 42, 46, 50, 54, 58, 61, 64, 67, 70, 73, 76, 79, 82, 92, 102 are exceptions.). If a resistance less than 10 MΩ is obtained, remove the connections from each terminal one at a time until the resistance is greater than 10 MΩ. Check the line that was removed last to locate and repair the ground fault.

Chapter 4
Input/Output Signals

This chapter describes the Input/Output Signals of AtlasSC Overspeed Trip System (Woodward P/N 8262-770).

Speed Signal Inputs

Connect MPUs (Magnetic Pick-up Unit can sense the frequency: 100-24950 Hz) to both Speed input channels because MPU is an appropriate sensor to sense gear teeth rotating at a high speed. The highest speed the AtlasSC control can sense is 20 000 rpm.

Set “MPU #1 Gear Teeth” to the number of gear teeth of the speed sensing gear which Speed Sensor #1 is attached to. Set “MPU #1, MPU #2 Max Speed” to the value larger than the rpm that might be sensed by Speed Input channel #1 or #2. The setpoint value entered here should be slightly higher than the overspeed setpoint value. (should be higher than ‘TACH at 20 mA’/0.998)

‘MPU #1, MPU #2 Max Speed’ *> ‘TACH at 20 mA’ / 0.998*

WARNING
In case the overspeed setpoint value is set to the value higher than ‘MPU #1, MPU #2 Max Speed’ setpoint, AtlasSC control can not sense a turbine overspeed because the control does not sense the speed higher than this speed setpoint even if the actual turbine speed exceeded this value.

The AtlasSC control calculates the speed signal resolution basing on ‘MPU #x Max rpm’ setpoint.

WARNING
The ‘number of gear teeth’ is used by the control to convert pulses from the speed-sensing device to turbine rpm. To prevent possible serious injury from an overspeeding turbine, make sure the control is properly programmed to convert the gear-tooth count into turbine rpm. Improper conversion could cause turbine overspeed.

Discrete Inputs (1 and 2)

The AtlasSC Overspeed Protection System uses two discrete inputs. The software of this system does not use other discrete inputs though they exist on the hardware.

Discrete Input 1:

RESET: momentary switch input to reset alarms.

Discrete Input 2:

SPEED SENSOR FAILURE OVERRIDE: Closing the contact disables the speed sensing failure function.

Overspeed Trip Contact Output (Relay output #1)

Overspeed Trip Contact is a normally closed contact which is closed when this device is powered and any overspeed trip has not happened yet. (The relay is energized.) Overspeed Trip Contact is opened if an overspeed was caused, both speed sensors failed, the CPU failed, power to this device is shut down or the operator entered into Configure mode using Watch Window program.

MPU 1 Failure Alarm Output (Relay output #2)

MPU 1 Failure Alarm Output is a normally closed contact output which is closed when this device is powered and any MPU #1 Failure has not been caused after the last reset command. (The relay is energized.) This contact is opened if an MPU #1 Failure was caused.

MPU 2 Failure Alarm Output (Relay output #3)

MPU 2 Failure Alarm Output is a normally closed contact output which is closed when this device is powered and any MPU #2 Failure has not been caused after the last reset command. (The relay is energized.) This contact is opened if an MPU #2 Failure was caused.

Speed Switch Outputs (Relay output #4-9)

Speed Switch Output are normally open contact outputs which are opened when the turbine speed sensed by MPU has not attained to the speed switch setpoint related to each relay. Each contact is closed when this device is powered and the turbine speed attained to the speed switch setpoint related to respective relay.

Sensed Speed Deviation Alarm Outputs (Relay output #10-11)

Sensed Speed Deviation Alarm Outputs are normally open contacts which are open when this device is powered and the difference between speeds sensed by MPU #1 and MPU #2 is within the specified range. (Each relay is de-energized.) Each contact is closed if the difference between speeds sensed by MPU #1 and MPU #2 exceeded the specified range.

Tachometer Outputs (Analog outputs)

Two analog output channels are available for tachometer indication. Set tachometer output ranges in Watch Window's Service mode.

MPU Speed Outputs (Analog outputs)

The turbine speed sensed by MPU #1 is indicated through an analog output. The turbine speed sensed by MPU #2 is indicated with another analog output as well. Set ranges for speed indication outputs in Watch Window's Service mode.

Chapter 5
Function and Operation Description

Overspeed Protection System (Woodward P/N 8262-770) has following software functions.

MPU Failure Override

Closing MPU Failure Override switch (Discrete input #2) is necessary when starting or stopping the turbine.

When starting the turbine, Close MPU Failure Override switch and Reset switch (a momentary switch connected to Discrete input #1). Then both MPU 1 Failure Alarm relay and MPU 2 Failure Alarm relay will be closed and alarm indication will be inactivated. MPU Failure Override switch must be 'opened' after the turbine speed exceeded the MPU Failure Speed setpoint.

When stopping the turbine, MPU Failure Override switch should be closed before the turbine speed lowers MPU Failure Speed setpoint. This saves an Alarm reset command when restarting the turbine.

Overspeed Trip

If a turbine overspeed was caused, this device de-energizes the relay of Overspeed Trip Contact Output (Relay output 1) to trip the turbine. In case Watch Window is connected, Overspeed Trip indication in Service mode turns to 'True' at the same time. This state is kept until a Reset command is given after the turbine speed lowered under Overspeed Trip speed setpoint.

If both turbine speeds sensed by MPU #1 and MPU #2 lowered under MPU Failure speed setpoint, both MPU #1 Failure alarm and MPU #2 Failure alarm are caused. This device de-energizes the relay of Overspeed Trip Contact Output as well as in the case of an overspeed. To remove this alarm, input a Reset command after disabling MPU #1 and #2 Failure alarms with MPU Failure Override function.

Tuning of MPU

Tuning the speed sensing block must be done before using an AtlasSC Overspeed Protection System. However, customers usually do not need to tune the speed sensing block because all functions of every AtlasSC have already been tuned in our plant before it is shipped basing on the customer's specification (except 'Speed Switch #x Hyster' setpoints).

WARNING

If the speed sensing block was not tuned accurately, this device may miss a turbine overspeed to shutdown. AtlasSC MUST be tuned again after any Configuration change on this Overspeed Protection System.

Tuning of Tachometer Outputs

Customers do not need to tune Tachometer Outputs because these circuits have already been tuned in our plant.

Tuning of MPU Speed Outputs

Customers do not need to tune MPU Speed Outputs because these circuits have already been tuned in our plant.

Chapter 6
Programming and Service Tool

Introduction

Due to the variety of installations, plus system and component tolerances, the AtlasSC™ control must be tuned to each system for optimum performance.

This chapter describes how to enter setpoints from each screen of Watch Window program. Watch Window program is used to download the AtlasSC control software to the control by connecting a PC and the control with an RS-232C serial cable. After downloading the control software, the user can verify the content of the downloaded software by using Watch Window which accesses the control through ServLink I/O. The software download to the control is done in our plant.

WARNING

An improperly calibrated control could miss a turbine overspeed to shutdown and may give damage to the turbine. To prevent possible serious injury from an overspeeding turbine, read this entire procedure and enter proper setpoints before starting the turbine.

Watch Window program for AtlasSC

Users can download the control software for this device from Woodward website. (The address of Woodward website is http://www.woodward.com/ic/software). Two versions of Watch Window: Standard edition and Professional edition are available for use with the AtlasSC control. Standard edition is produced free, but there are restrictions on the application software download function and on accessing to debug menus. There is no restriction on the Professional edition.

To tune the Overspeed Protection System's setpoints, follow procedures below.

- Connecting the AtlasSC control to a PC with an RS-232C serial cable
- Loading the Watch Window Standard software as well as the ServLink I/O software on the PC
- Applying power to the control
- Opening communications with the control
- Using Watch Window to view variables and to tune the control
- Downloading tunable and configuration variables to the AtlasSC control

Connecting the AtlasSC Control to a PC

Make sure that all other programs that may access your computer's communication port are shut down.

Connect the PC to Serial port #3 of the AtlasSC control using a Null Modem cable (Cross cable).

Refer Control Wiring diagrams attached to the end of this manual.

Starting Overspeed Protection System

Software installation

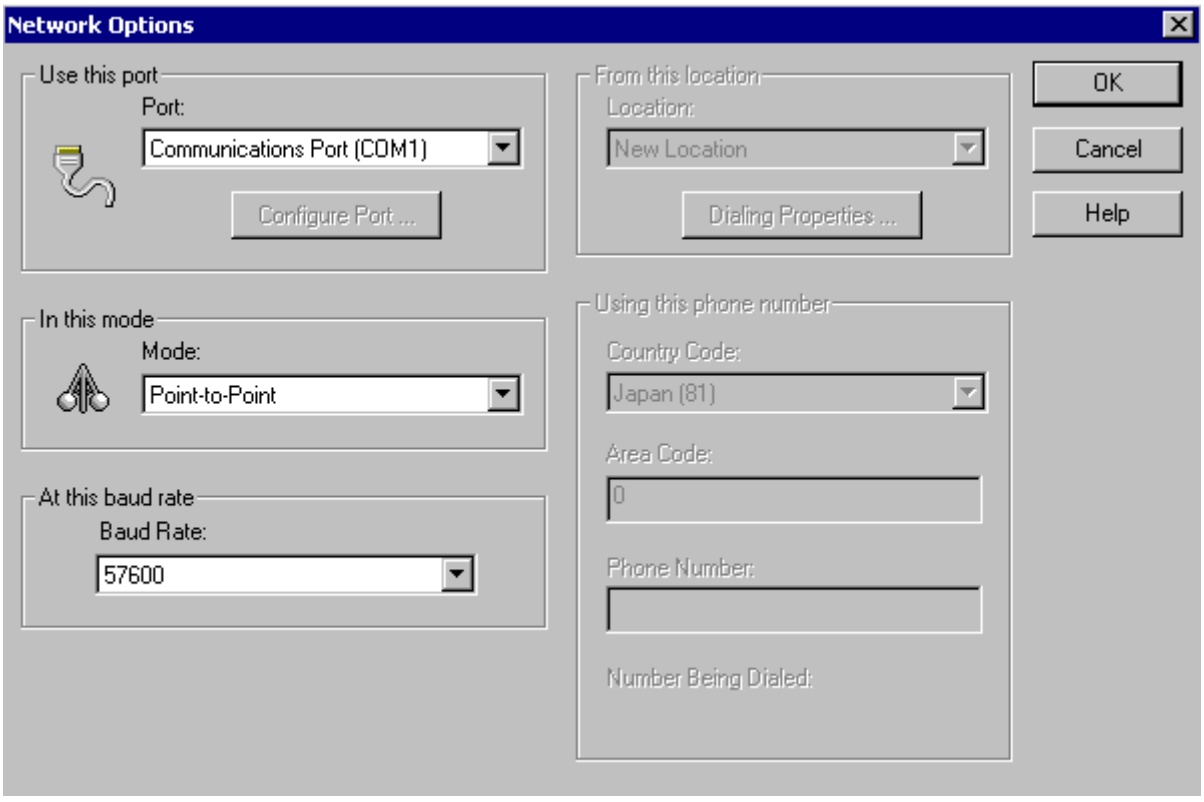
Run “WWStd152_D.exe” program to start the software installation. After the installation completed, Woodward Watch Window folder will appear in the PC’s Start menu. The operator needs to run ServLink I/O Server program first because this is an indispensable software for Watch Window to communicate through RS-232C port. Starting procedures are described below.

Starting ServLink Server

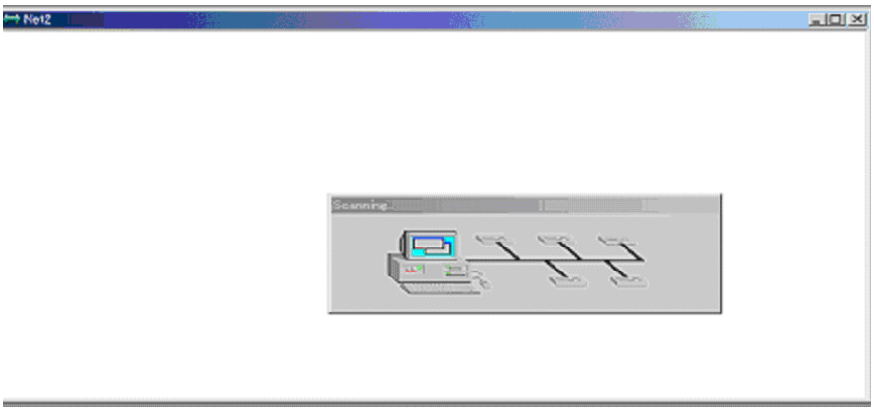
Start the ServLink software by selecting Start> Programs> Woodward> Watch Window Standard 1.5.2 > ServLink Server on the PC. Then select File> New on the ServLink dialog window.

Setting ServLink I/O Server program

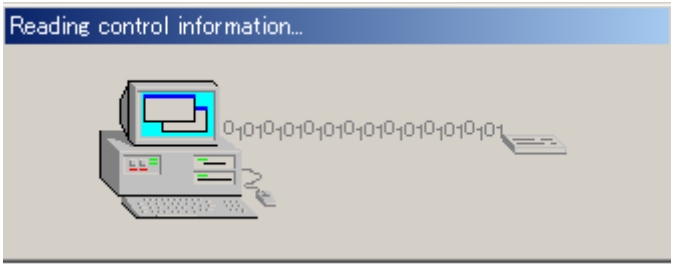
In the dialog window select the proper COM port for your computer, select POINT TO POINT communications mode, and set the baud rate to 57600 as shown below. This is the factory default baud rate. If the control has been re-programmed after leaving the factory, the user may need to contact the entity that supplied the new program to determine the correct baud rate.



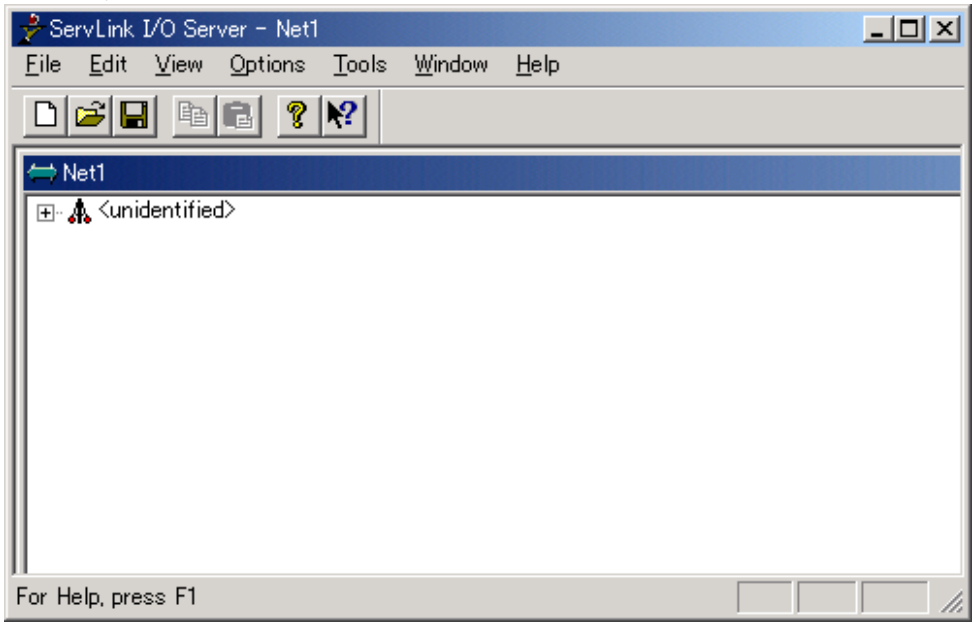
Click ‘OK’ after selecting necessary parameters, then the download will start.



The following window will be displayed when the download is processed normally.



When all the setpoints were transferred from AtlasSC control to the PC successfully, the window below will be displayed. This window can be minimized and put into the task bar.



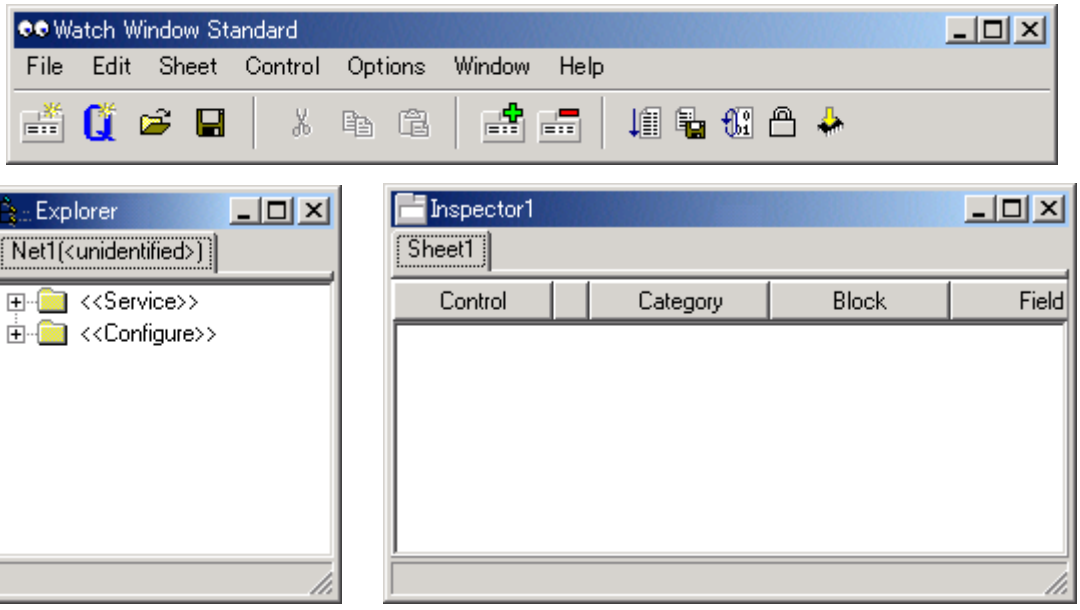
If these setpoints were stored as a file using “Save AS” command in File menu, they can be read from the file using “Open” command more quickly rather than when they are transferred from the AtlasSC again.

If the PC failed to download setpoints, the window below will be displayed. Retry again.

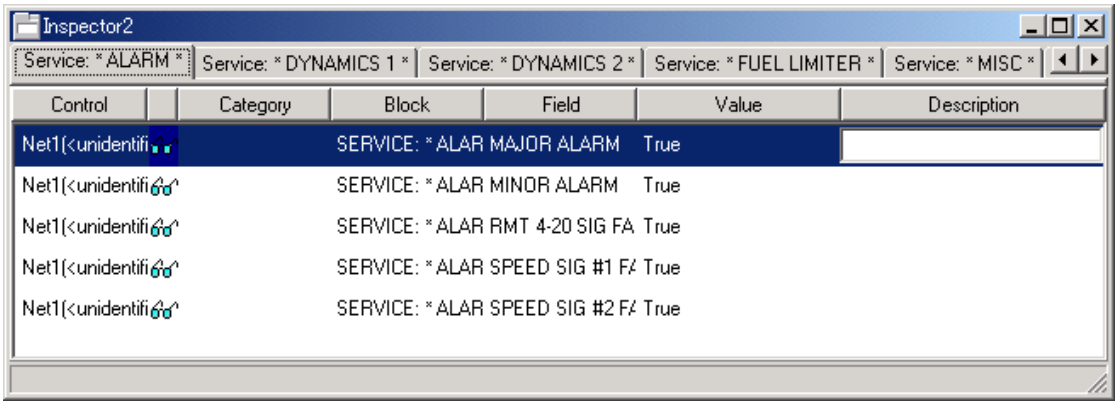
If the PC succeeded to download setpoints, Watch Window Standard screen will be opened. Watch Window Standard screen will not be opened if Watch Window Standard has failed to communicate to ServLink I/O Server program.

Starting-up Watch Window software

Start the Watch Window software by selecting Start> Programs> Woodward> Watch Window Standard 1.5.2 on the PC. Then, windows below will be displayed.



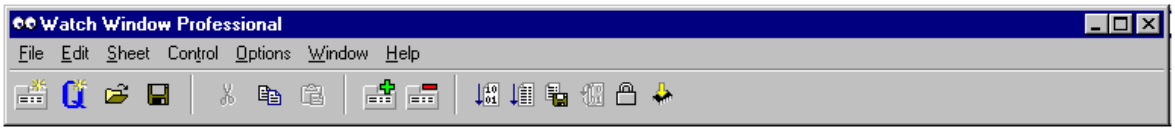
By clicking 'Q' icon, all the setpoints in Service menus and Configure menus will be displayed on Inspector windows as standard setpoint lists. The user can display necessary setpoints (as custom setpoint lists) on the Inspector window moving them from Explorer window with "drag and drop" operations.



Adding/Reducing a Window

To add an Inspector Window, click the green 'plus' icon ( ) on Watch Window's Tool bar.
To reduce an Inspector Window, Click the red 'minus' icon ( ).

Confirming the control software version

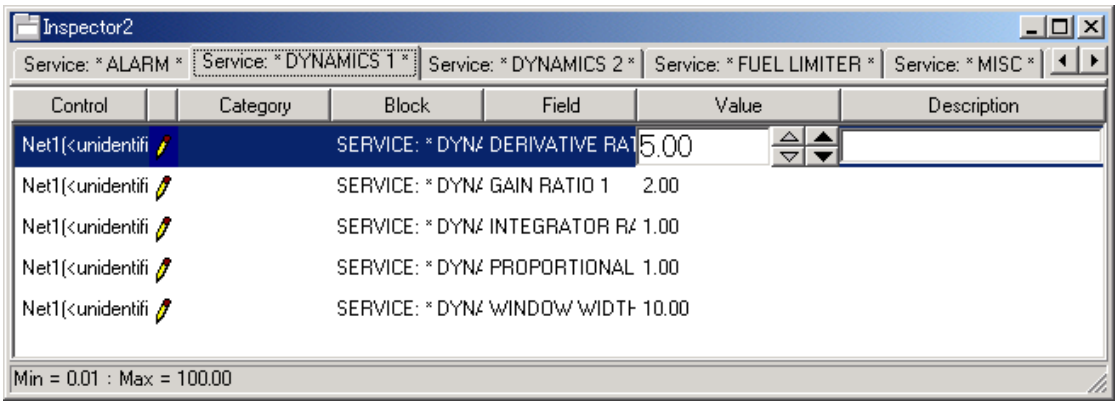


To see the control software's part number and its revision, select Control > Properties > Application on Watch Window's Tool bar.

To change setpoints

After Inspector windows were made, if these windows were stored into PC's hard disc with 'Save AS' command in File menu, the operator can display the setpoints in these windows just by accessing the hard disc.

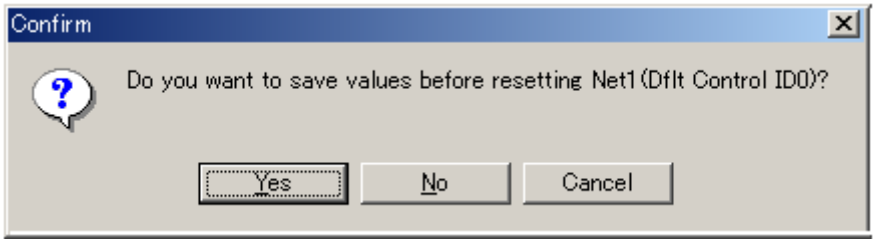
To change a setpoint value, click △▽ or ▲▼ buttons locating right end of the value column. △▽ buttons are used to add or reduce the setpoint 1 %. ▲▼ buttons are used to add or reduce the setpoint 10 %. After changing setpoints, click icon to store setpoints to the AtlasSC control.



To enter Configure menus, LOCK IO function must be disabled. To disable LOCK IO function, click icon on Watch Window's Tool bar. Then, the following window will pop up.

Select 'Yes', then the window below will be displayed.

Click 'OK', and change necessary setpoint values. Reset the AtlasSC control after every setpoint change.



Click icon on Watch Window's Tool bar to reset, and view the LED on Power Supply board is extinguished and illuminates again. This device will not work normally until it was reset.
Tune Tachometer Output ranges and MPU Speed Output ranges in a Service menu. Setpoints in Service menus can be changed without disabling LOCK IO function.

HELP

If you have any question on usage of Watch Window Standard, click ‘Help’ on Watch Window’s Tool bar to open HELP Windows. Detail operation description for Watch Window program will be displayed.

CAUTION
To prevent this Overspeed Protection System from missing to shutdown an overspeeding prime mover due to an improperly calibrated AtlasSC control, store setpoints to the control before turning off power to the control. All setpoints will revert to values before they were changed if power to the control is turned off before setpoints are stored.

CAUTION
Store setpoints to the AtlasSC control every time after setpoints were changed or retuned. All setpoints will revert to values before they were changed if power to the control is turned off before setpoints are stored.

Configure Menu's setpoints

∗CONFIGURE ∗

1. Overspeed Set (rpm) (∗250～20000)
   determines the overspeed trip speed to shutdown the prime mover.

WARNING
If this setpoint is set to an inappropriate value, this Overspeed Protection System could miss a turbine overspeed to shutdown, or could shutdown a normally operating turbine.

2. MPU Fail Set (rpm) (∗200 ~ 20000 rpm)
   sets the MPU failure speed of the prime mover.

CAUTION
'MPU Fail Set' setpoint must be higher than the value, "MPU #1, MPU #2 Max Speed X 0.02". Otherwise, the AtlasSC control can not detect an MPU failure.

3. MPU #1 Gear Teeth (∗1 ~ 300)
   is the number of gear teeth that Speed sensor #1 is on.

WARNING
If this setpoint is set to an inappropriate value, this Overspeed Protection System could miss a turbine overspeed to shutdown, or could shutdown a normally operating turbine.

4. MPU #2 Gear Teeth (∗1 ~ 300)
   is the number of gear teeth that Speed sensor #2 is on.

WARNING
If this setpoint is set to an inappropriate value, this Overspeed Protection System could miss a turbine overspeed to shutdown, or could shutdown a normally operating turbine.

5. Trip Both MPU Fail ? (∗TRUE/FALSE)
   is set to 'TRUE' if the turbine should be tripped when both speed sensors failed.

6. Speed Diff Alm Use ?(∗TRUE/FALSE)
   is set to 'TRUE' if an alarm should be caused when the speed difference between MPU #1 and MPU #2 exceeded the specified range as Window Width.

7. Window Width (rpm) (∗1～20000)
   is the speed range which a speed difference should exceed before the Sensed Speed Deviation alarm is caused.

8. MPU#1,MPU#2 Max Speed(rpm) (∗250～20000)
   determines the max speed sensible with MPU #1 and MPU #2 in rpm.

CAUTION
"MPU #1, MPU #2 Max Speed" must be higher than the value, 'TACH at 20 mA' / 0.998. Otherwise, this Overspeed Protection System can not sense the speed signal correctly.

WARNING
This setpoint value must be the turbine speed at which a mechanical overspeed trip device should trip the turbine, or the turbine speed which is equivalent to "turbine's rated speed X 1.25".

9. Speed Diff Alm Add ?(∗TRUE/FALSE)
   is set to 'TRUE' to indicate MPU failure alarm is caused when "Speed Diff Alm Use ?" above is set to 'TRUE'

∗SPEED SWITCH SET ∗

1. Speed Switch #1 Set(rpm) (∗0～15000)
   is the speed level that HSS bus output must have attained to before Speed Switch #1 is closed.

2. Speed Switch #2 Set(rpm) (∗0～15000)
   is the speed level that HSS bus output must have attained to before Speed Switch #2 is closed.

3. Speed Switch #3 Set(rpm) (∗0～15000)
   is the speed level that HSS bus output must have attained to before Speed Switch #3 is closed.

4. Speed Switch #4 Set(rpm) (∗0～15000)
   is the speed level that HSS bus output must have attained to before Speed Switch #4 is closed.

5. Speed Switch #5 Set(rpm) (∗0～15000)
   is the speed level that HSS bus output must have attained to before Speed Switch #5 is closed.

6. Speed Switch #6 Set(rpm) (∗0～15000)
   is the speed level that HSS bus output must have attained to before Speed Switch #6 is closed.

7. Speed Switch #1 Hyster (rpm) (∗–100～100)
   sets the hysteresis of Speed Switch #1 in rpm.

8. Speed Switch #2 Hyster (rpm) (∗–100～100)
   sets the hysteresis of Speed Switch #2 in rpm.

9. Speed Switch #3 Hyster (rpm) (∗–100～100)
   sets the hysteresis of Speed Switch #3 in rpm.

10. Speed Switch #4 Hyster (rpm) (∗–100～100)
    sets the hysteresis of Speed Switch #4 in rpm.

11. Speed Switch #5 Hyster (rpm) (∗–100～100)
    sets the hysteresis of Speed Switch #5 in rpm.

12. Speed Switch #6Hyster (rpm) (∗–100～100)
    sets the hysteresis of Speed Switch #6 in rpm.

CAUTION
Woodward tunes all other Configuration setpoints except Speed Switch #x Hyster (rpm) before shipping. Customers must tune Speed Switch #x Hyster setpoints.

Service Menu's setpoints

MONITOR

1. Speed HSS_BUS(rpm)
   indicates the current turbine speed.

2. Speed MPU#1(rpm)
   indicates the current turbine speed sensed by Speed Sensor #1.

3. Speed MPU#2(rpm)
   indicates the current turbine speed sensed by Speed Sensor #2.

TRIP&ALRAM

1. Overspeed Trip
   indicates 'TRUE' when an overspeed was caused.

2. Trip Both MPU Failed
   indicates 'TRUE' when both speed sensors failed.

3. MPU#1 Alarm
   indicates 'TRUE' when MPU #1 failure alarm was caused.

4. MPU#2 Alarm
   indicates 'TRUE' when MPU #2 failure alarm was caused.

5. MPU#1 Down (<#2) Alarm
   indicates 'TRUE' when the speed sensed with MPU #1 dropped from the speed sensed with MPU #2 by "Window Width" or more.

6. MPU#2 Down (<#1) Alarm
   indicates 'TRUE' when the speed sensed with MPU #2 dropped from the speed sensed with MPU #1 by "Window Width" or more.

7. Overspeed Trip Relay
   indicates 'TRUE' either when a turbine overspeed was caused merely or when both speed sensors failed where "Trip Both MPU Fail?" and "Speed Diff Alm Add?" are set to 'TRUE'.

8. MPU#1 Failed Relay
   indicates 'TRUE' when MPU #1 failed.

9. MPU#2 Failed Relay
   indicates 'TRUE' when MPU #2 failed.

10. Alarm Reset?
    is used to reset alarms on Watch Window screens. Set this setpoint to 'TRUE', then to 'FALSE' to reset alarms.

DI/DO STATUS

1. Override Contact
   indicates ‘TRUE’ if MPU Failure Override command is currently input (Discrete Input #1 = High).

2. Reset Contact
   indicates ‘TRUE’ if Reset command is currently input (Discrete Input #2 = High).

TACH SET MENU

1. OUT_A TACH at 4mA(rpm)
   determines the turbine speed when Tachometer A’s output current is 4 mA.

2. OUT_A TACH at 20mA(rpm)
   determines the turbine speed when Tachometer A’s output current is 20 mA.

3. OUT_B TACH at 4mA(rpm)
   determines the turbine speed when Tachometer B’s output current is 4 mA.

4. OUT_B TACH at 20mA(rpm)
   determines the turbine speed when Tachometer B’s output current is 20 mA.

5. MPU#1 SPEED 4mA(rpm)
   determines the turbine speed when #1 MPU Speed Output’s output current is 4 mA.

6. MPU#1 SPEED 20mA(rpm)
   determines the turbine speed when #1 MPU Speed Output’s output current is 20 mA.

7. MPU#2 SPEED 4mA(rpm)
   determines the turbine speed when #2 MPU Speed Output’s output current is 4 mA.

8. MPU#2 SPEED 20mA(rpm)
   determines the turbine speed when #2 MPU Speed Output’s output current is 20 mA.

Application: _____

Date: _____

* * ATLAS SC Overspeed Switch Programming Worksheet * *

P/N 8262-770

* is followed by an initial value, a lower limit. and an upper limit.
Enter a check mark to select either ☐TRUE or ☐FALSE.

<<CONFIGURE・MODE>>
<CONFIGURE MENU#1>

1. OVERSPEED SET(RPM) ***8000(250～20000)** _____ **rpm**
[Overspeed trip speed]

2. MPU FAIL SET(RPM) ***400(200～20000)** _____ **rpm**
[MPU Failure speed]
NOTE: This setpoint must be greater than the value, "MPU#1,MPU#2 MAX SPEED(RPM)" X 0.02

3. MPU#1 GEAR TEETH ***30(1～300)** _____
[The number of gear teeth which MPU #1 is attached on]

4. MPU#2 GEAR TEETH ***30(1～300)** _____
[The number of gear teeth which MPU #2 is attached on]

5. TRIP BOTH MPU FAIL? **■TRUE ☐FALSE** **☐TRUE ☐FALSE**
[Does Both MPU Failure trip the turbine?]

6. SPEED DIFF ALARM ADD? **☐TRUE ■FALSE** **☐TRUE ☐FALSE**
[Is an Alarm relay used to indicate a speed deviation error ?]

7. WINDOW WIDTH(RPM) ***200(1～20000)** _____ **rpm**
[The speed range to activate K10 or K11 relay for the speed deviation error.]

8. MPU#1,MPU#2 MAX SPEED(RPM) ***11000(250～20000)** _____ **rpm**
[Maximum turbine speed sensed with MPU #1 and MPU #2]
NOTE: This setpoint must be greater than the value, "OUT_A/B TACH AT 20 mA" / 0.998

9. SPEED DIFF ALM USE? **■TRUE ☐FALSE** **☐TRUE ☐FALSE**
[Is Speed deviation error an alarm?]

<SPEED SWITCH SET>

10. SPEED SWITCH #1 SET(RPM) ***8000(0～15000)** _____ **rpm**

11. SPEED SWITCH #2 SET(RPM) ***6000(0～15000)** _____ **rpm**

12. SPEED SWITCH #3 SET(RPM) ***4000(0～15000)** _____ **rpm**

13. SPEED SWITCH #4 SET(RPM) ***2000(0～15000)** _____ **rpm**

14. SPEED SWITCH #5 SET(RPM) ***2000(0～15000)** _____ **rpm**

15. SPEED SWITCH #6 SET(RPM) ***2000(0～15000)** _____ **rpm**

16. SPEED SWITCH #1 HYSTER(RPM) ***0(-100～100)** _____ **rpm**

17. SPEED SWITCH #2 HYSTER(RPM) ***0(-100～100)** _____ **rpm**

18. SPEED SWITCH #3 HYSTER(RPM) ***0(-100～100)** _____ **rpm**

19. SPEED SWITCH #4 HYSTER(RPM) ***0(-100～100)** _____ **rpm**

20. SPEED SWITCH #5 HYSTER(RPM) ***0(-100～100)** _____ **rpm**

21. SPEED SWITCH #6 HYSTER (RPM) ***0(-100～100)** _____ **rpm**

<<SERVICE･MODE >>
<TACH SET MENU>

22. OUT_A TACH AT 4MA(RPM) ***0(0～20000)** _____ **rpm**
[the turbine speed when Tachometer A output is 4 mA.]

23. OUT_A TACH AT 20MA(RPM) ***10000(0～20000)** _____ **rpm**
[the turbine speed when Tachometer A output is 20 mA.]

24. OUT_B TACH AT 4MA(RPM) ***0(0～20000)** _____ **rpm**
[the turbine speed when Tachometer B output is 4 mA.]

25. OUT_B TACH AT 20MA(RPM) ***10000(0～20000)** _____ **rpm**
[the turbine speed when Tachometer B output is 20 mA.]

26. MPU#1 SPEED 4MA(RPM) ***0(0～20000)** _____ **rpm**
[the turbine speed sensed with MPU #1 when current output is 4 mA.]

27. MPU#1 SPEED 20MA(RPM) ***10000(0～20000)** _____ **rpm**
[the turbine speed sensed with MPU #1 when current output is 20 mA.]

28. MPU#2 SPEED 4MA(RPM) ***0(0～20000)** _____ **rpm**
[the turbine speed sensed with MPU #2 when current output is 4 mA.]

29. MPU#2 SPEED 20MA(RPM) ***10000(0～20000)** _____ **rpm**
[the turbine speed sensed with MPU #2 when current output is 20 mA.]

Chapter 7
Service Options

Product Service Options

The following factory options are available for servicing Woodward equipment, based on the standard Woodward Product and Service Warranty (5-01-1205) that is in effect at the time the product is purchased from Woodward or the service is performed:

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

If you are experiencing problems with installation or unsatisfactory performance of an installed system, the following options are available:

- Consult the troubleshooting guide in the manual.
- Contact Woodward technical assistance (see “How to Contact Woodward” later in this chapter) and discuss your problem. In most cases, your problem can be resolved over the phone. If not, you can select which course of action you wish to pursue based on the available services listed in this section.

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 also a flat rate structured program and includes the full standard Woodward product warranty (Woodward Product and Service Warranty 5-01-1205).

This option allows you to call 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 Woodward facility as explained below (see “Returning Equipment for Repair” later in this chapter).

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 to Woodward within 60 days, Woodward will issue a credit for the core charge. [The core charge is the average difference between the flat rate replacement/exchange charge and the current list price of a new unit.]

Return Shipment Authorization Label. To ensure prompt receipt of the core, and avoid additional charges, the package must be properly marked. A return authorization label is included with every Replacement/Exchange unit that leaves Woodward. The core should be repackaged and the return authorization label affixed to the outside of the package. Without the authorization label, receipt of the returned core could be delayed and cause additional charges to be applied.

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 to Woodward for repair, please contact Woodward in advance to obtain a Return Authorization Number. When shipping the item(s), attach a tag with the following information:

- 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.

CAUTION—ELECTROSTATIC DISCHARGE

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*.

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.

Return Authorization Number

When returning equipment to Woodward, please telephone and ask for the Customer Service Department [1 (800) 523-2831 in North America or
+1 (970) 482-5811]. They will help expedite the processing of your order through our distributors or local service facility. To expedite the repair process, contact Woodward in advance to obtain a Return Authorization Number, and arrange for issue of a purchase order for the item(s) to be repaired. No work can be started until a purchase order is received.

NOTE

We highly recommend that you make arrangement in advance for return shipments. Contact a Woodward customer service representative at 1 (800) 523-2831 in North America or +1 (970) 482-5811 for instructions and for a Return Authorization Number.

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.

How to Contact Woodward Japan

In North America use the following address when shipping or corresponding:

Woodward Governor Company, Japan
19F WBG (World Business Garden) Marive West
2-6 Nakase, Mihama-ku, Chiba-shi, Chiba
261-7119 JAPAN

Telephone—+81 (43)-213-2191 (24 hours a day)
Fax—+81 (43)-213-2199

For assistance outside North America, call one of the following international 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.

Facility	**Phone Number**
Brazil	+55 (19) 3708 4800
India	+91 (129) 4097100
Japan	+81 (476) 93-4661
The Netherlands	+31 (23) 5661111
Colorado	+1 (970) 482-5811 (24 hours a day)
Toll-free Phone (in U.S.)	+1 (800) 523-2831

You can also contact the Woodward Customer Service Department or consult our worldwide directory on Woodward's website (www.woodward.com) for the name of your nearest Woodward distributor or service facility.

Engineering Services

Woodward Industrial Controls Engineering Services offers the following after-sales support for Woodward products. For these services, you can contact us by telephone, by email, or through the Woodward website.

- Technical Support
- Product Training
- Field Service

Contact information:

Telephone—+1 (970) 482-5811
Toll-free Phone (in North America)—1 (800) 523-2831
Email—icinfo@woodward.com
Website—**www.woodward.com**

Technical Support is available through our many worldwide locations or our authorized distributors, depending upon the product. This service can assist you with technical questions or problem solving during normal business hours. Emergency assistance is also available during non-business hours by phoning our toll-free number and stating the urgency of your problem. For technical support, please contact us via telephone, email us, or use our website and reference *Customer Services* and then *Technical Support*.

Product Training is available at many of our worldwide locations (standard classes). 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. For information concerning training, please contact us via telephone, email us, or use our website and reference *Customer Services* and then *Product Training*.

Field Service engineering on-site support is available, depending on the product and location, from one of our many worldwide locations or from one of our authorized 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 field service engineering assistance, please contact us via telephone, email us, or use our website and reference *Customer Services* and then *Technical Support*.

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:

General

Your Name_____

Site Location_____

Phone Number_____

Fax Number_____

Prime Mover Information

Engine/Turbine Model Number_____

Manufacturer_____

Number of Cylinders (if applicable)_____

Type of Fuel (gas, gaseous, steam, etc)_____

Rating_____

Application_____

Control/Governor Information

Please list all Woodward governors, actuators, and electronic controls in your system:

Woodward Part Number and Revision Letter

_____

Control Description or Governor Type

_____

Serial Number

_____

Woodward Part Number and Revision Letter

_____

Control Description or Governor Type

_____

Serial Number

_____

Woodward Part Number and Revision Letter

_____

Control Description or Governor Type

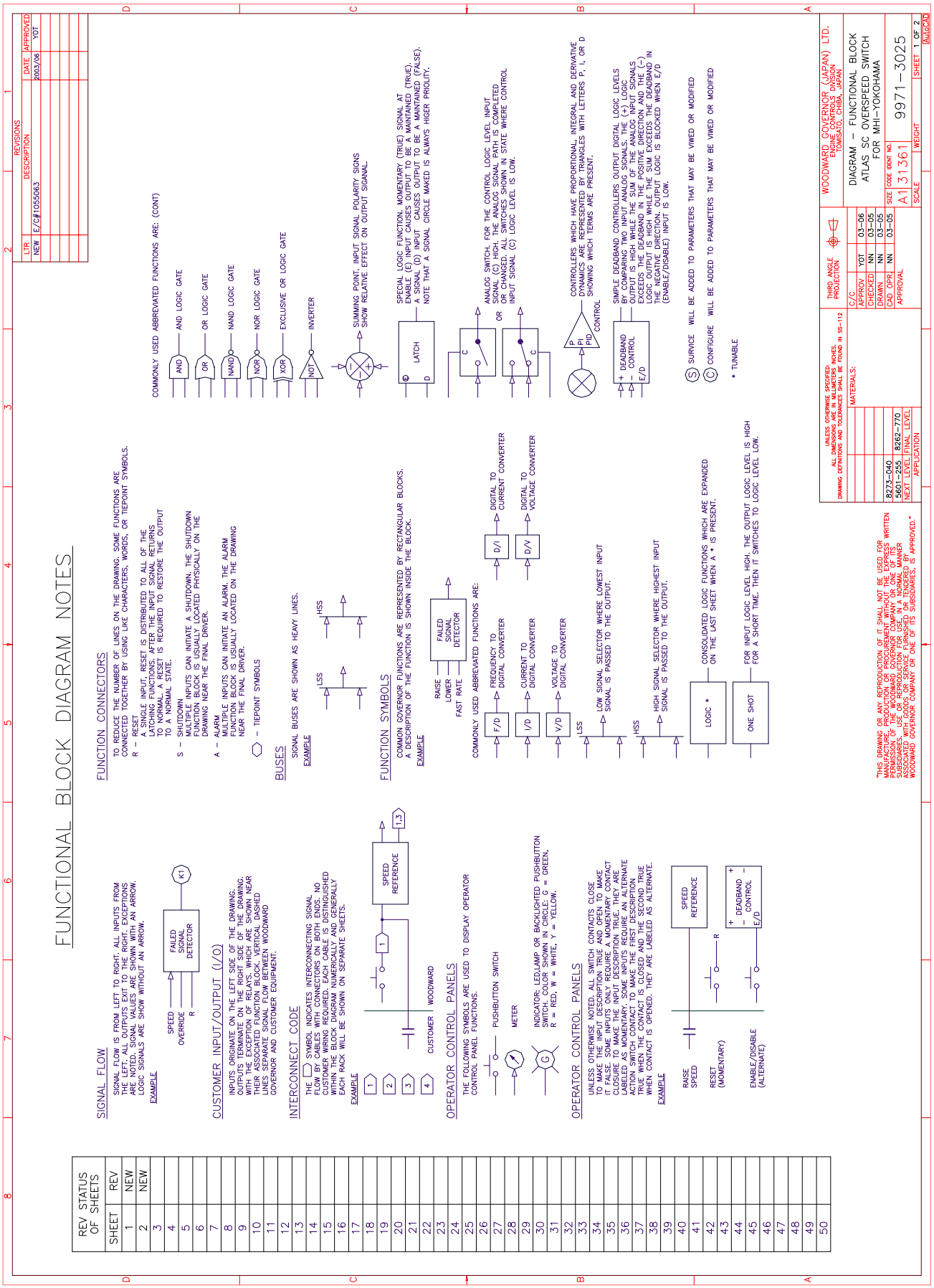
_____

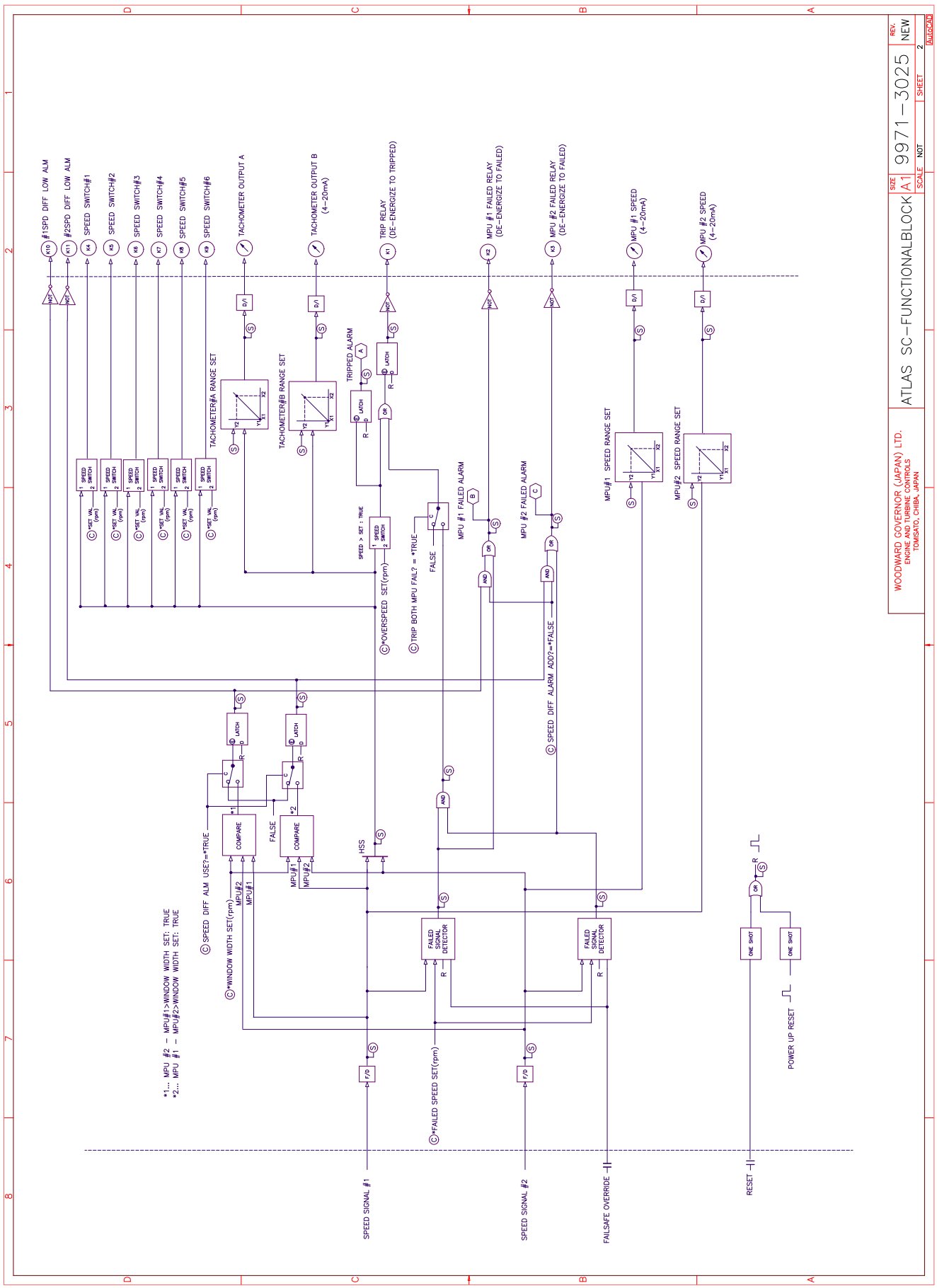
Serial Number

_____

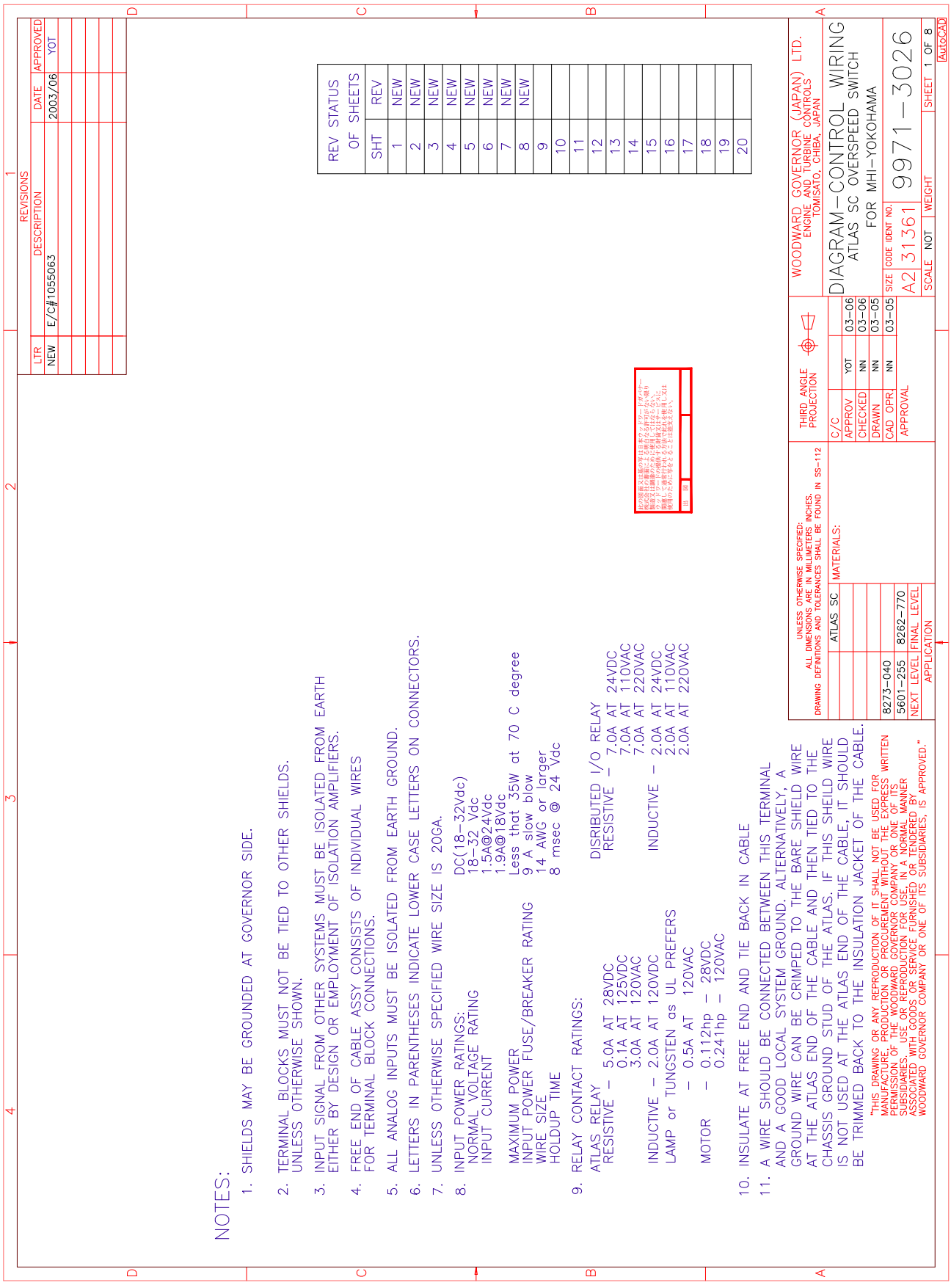
If you have an electronic or programmable control, please have the adjustment setting positions or the menu settings written down and with you at the time of the call.

Function Block Diagrams




ATLAS SC-FUNCTIONALBLOCK
9971-3025
WOODWARD GOVERNOR (JAPAN) LTD.
ENGINE AND TURBINE CONTROLS
TOMISATO, CHIBA, JAPAN
#1SPD DIFF LOW ALM
#2SPD DIFF LOW ALM
SPEED SWITCH#1
SPEED SWITCH#2
SPEED SWITCH#3
SPEED SWITCH#4
SPEED SWITCH#5
SPEED SWITCH#6
TACHOMETER OUTPUT A
TACHOMETER OUTPUT B (4-20mA)
TRIP RELAY (DE-ENERGIZE TO TRIPPED)
MPU #1 FAILED RELAY (DE-ENERGIZE TO FAILED)
MPU #2 FAILED RELAY (DE-ENERGIZE TO FAILED)
MPU #1 SPEED (4-20mA)
MPU #2 SPEED (4-20mA)
TACHOMETER#A RANGE SET
TACHOMETER#B RANGE SET
TRIPPED ALARM
MPU#1 SPEED RANGE SET
MPU#2 SPEED RANGE SET
SET VAL (rpm)
SPEED SWITCH
OVERSPEED SET(rpm)
SPEED > SET : TRUE
TRIP BOTH MPU FAIL? = *TRUE
MPU #1 FAILED ALARM
MPU #2 FAILED ALARM
SPEED DIFF ALARM ADD?=*FALSE
SPEED DIFF ALM USE?=*TRUE
WINDOW WIDTH SET(rpm)
COMPARE
FALSE
HSS
FAILED SIGNAL DETECTOR
FAILED SPEED SET(rpm)
SPEED SIGNAL #1
SPEED SIGNAL #2
FAILSAFE OVERRIDE
RESET
POWER UP RESET
ONE SHOT
*1... MPU #2 — MPU#1>WINDOW WIDTH SET: TRUE
*2... MPU #1 — MPU#2>WINDOW WIDTH SET: TRUE

Control Wiring Diagrams



SHEET NUMBER	PART NUMBER	DESCRIPTION
SHEET 01	–	COVER
SHEET 02	–	SHEET/CABLE INDEX
SHEET 03	–	OVERVIEW
SHEET 04	–	SMARTCORE BOARD : DISCRETE INPUT
SHEET 05	–	SMARTCORE BOARD : ANALOG INPUT/SPEED INPUT
SHEET 06	–	SMARTCORE BOARD : ACTUATOR OUTPUT /ANALOG OUTPUT
SHEET 07	–	SMARTCORE(MAIN) : SERIAL PORT
SHEET 08	–	POWER SUPPLY BOARD : POWER IN/DISCRETE OUTPUT

CABLE DESIGNATION	CABLE PART NUMBER	CABLE LENGHT	DESCRIPTION
W1	–	N/A(m)	RS232C CABLE (DB 9 pin M <=> DB 9 pin F)
W2	–	N/A(m)	CABLE FOR DISRIBUTED I/O
			.

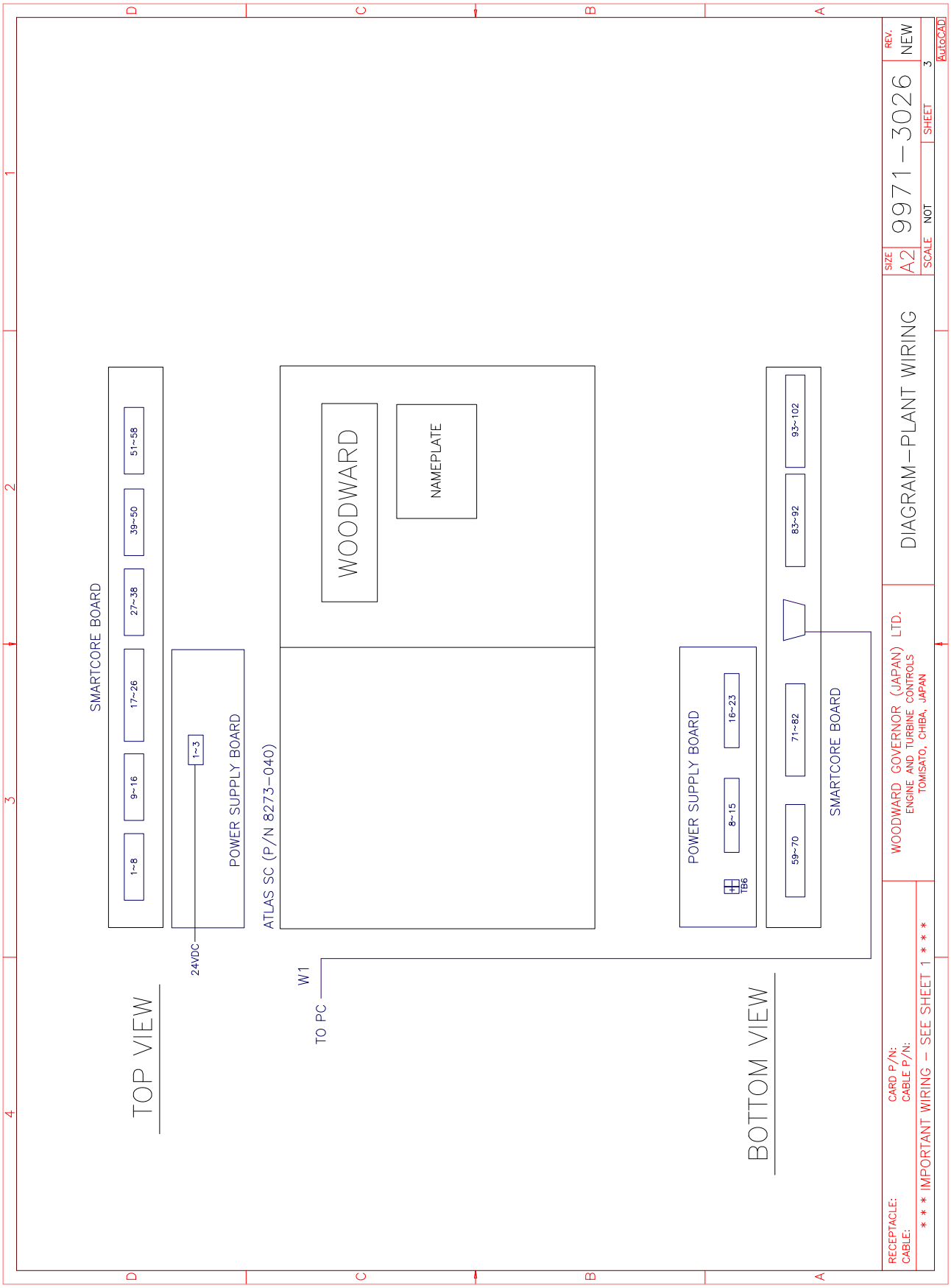
RECEPTACLE: CARD P/N:
CABLE: CABLE P/N:
* * * IMPORTANT WIRING – SEE SHEET 1 * * *

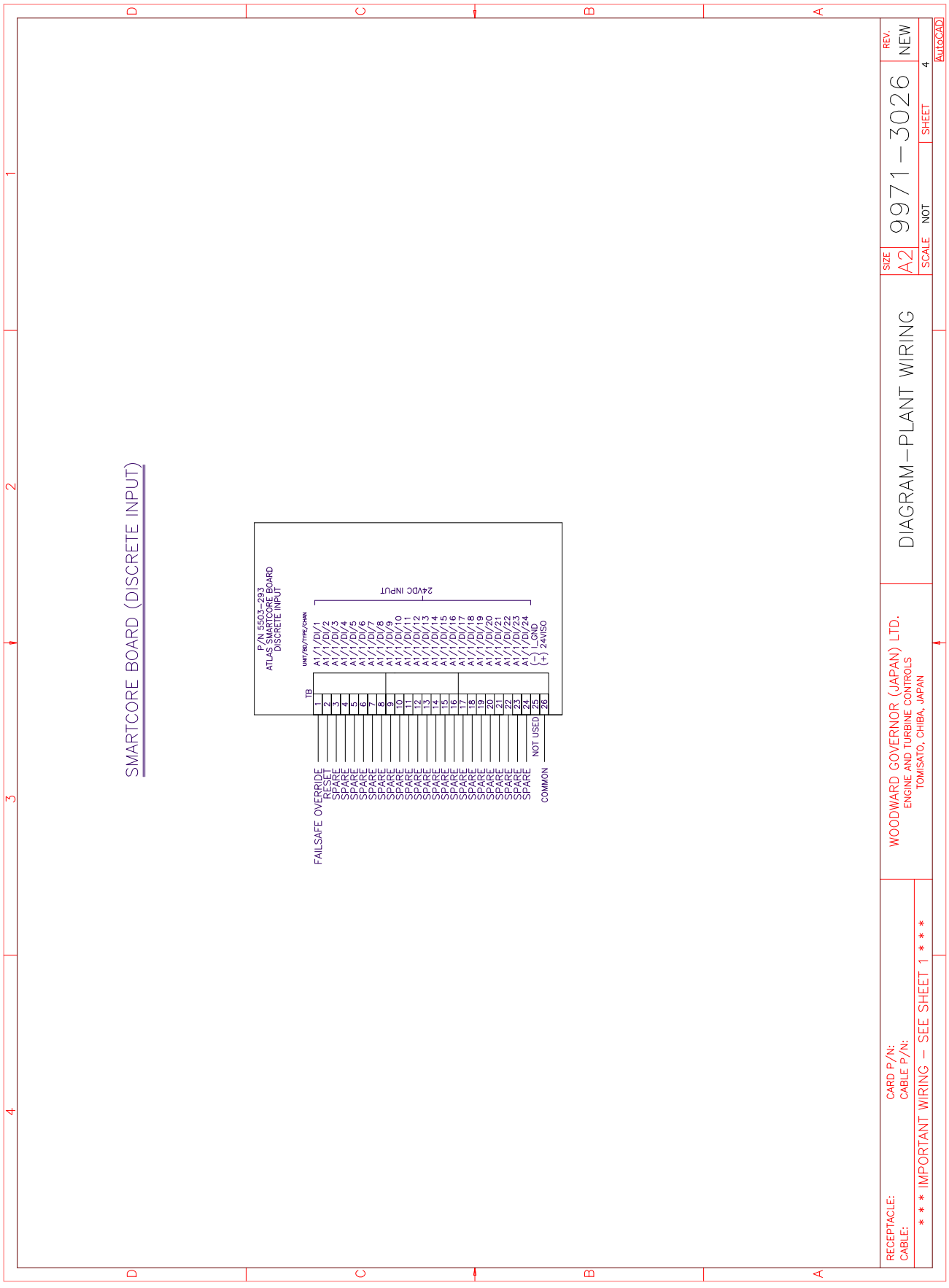
WOODWARD GOVERNOR (JAPAN) LTD.
ENGINE AND TURBINE CONTROLS
TOMISATO, CHIBA, JAPAN

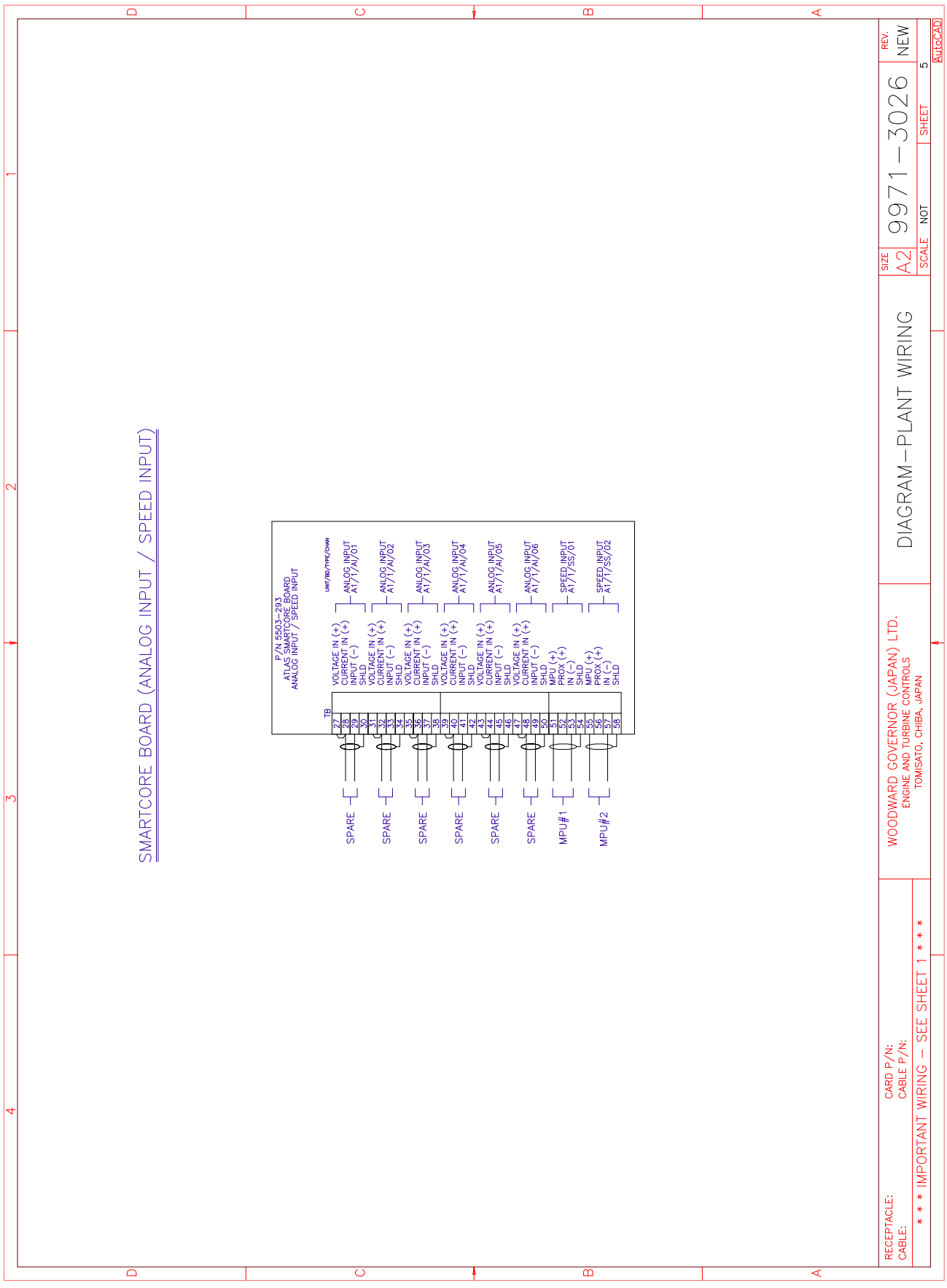
DIAGRAM–PLANT WIRING

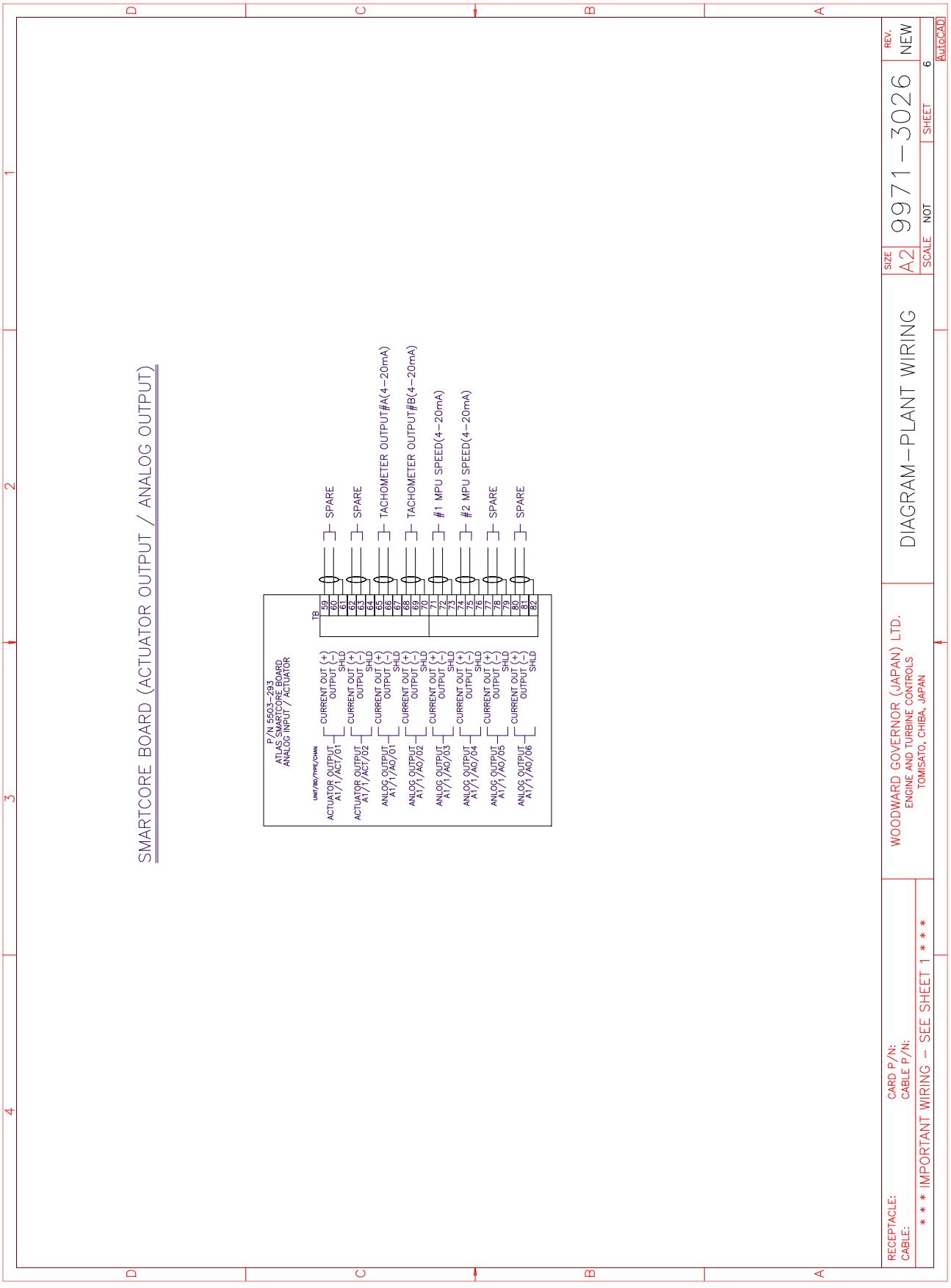
SIZE A2 | 9971–3026 | REV. NEW
SCALE NOT | SHEET 2

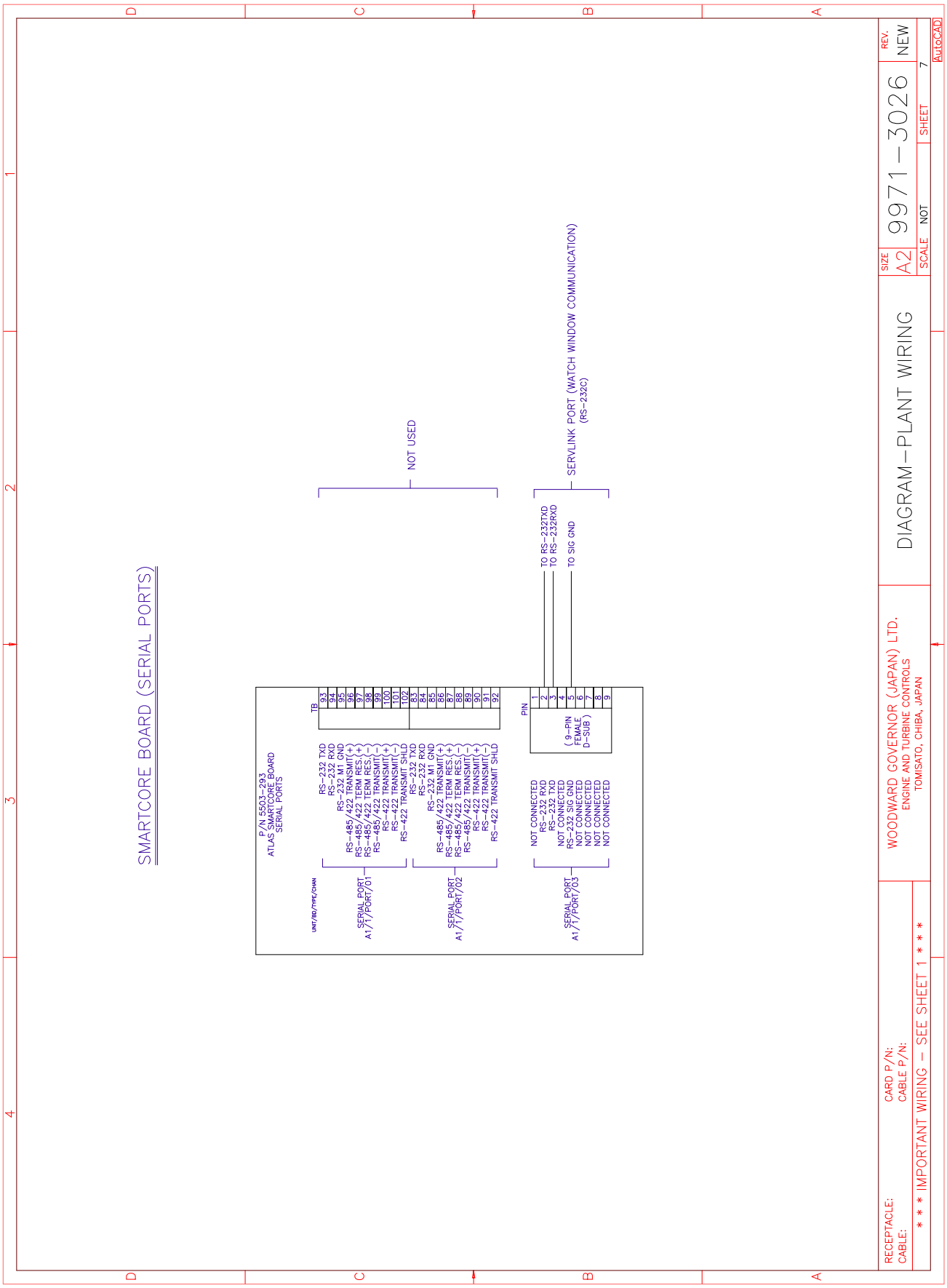
AutoCAD

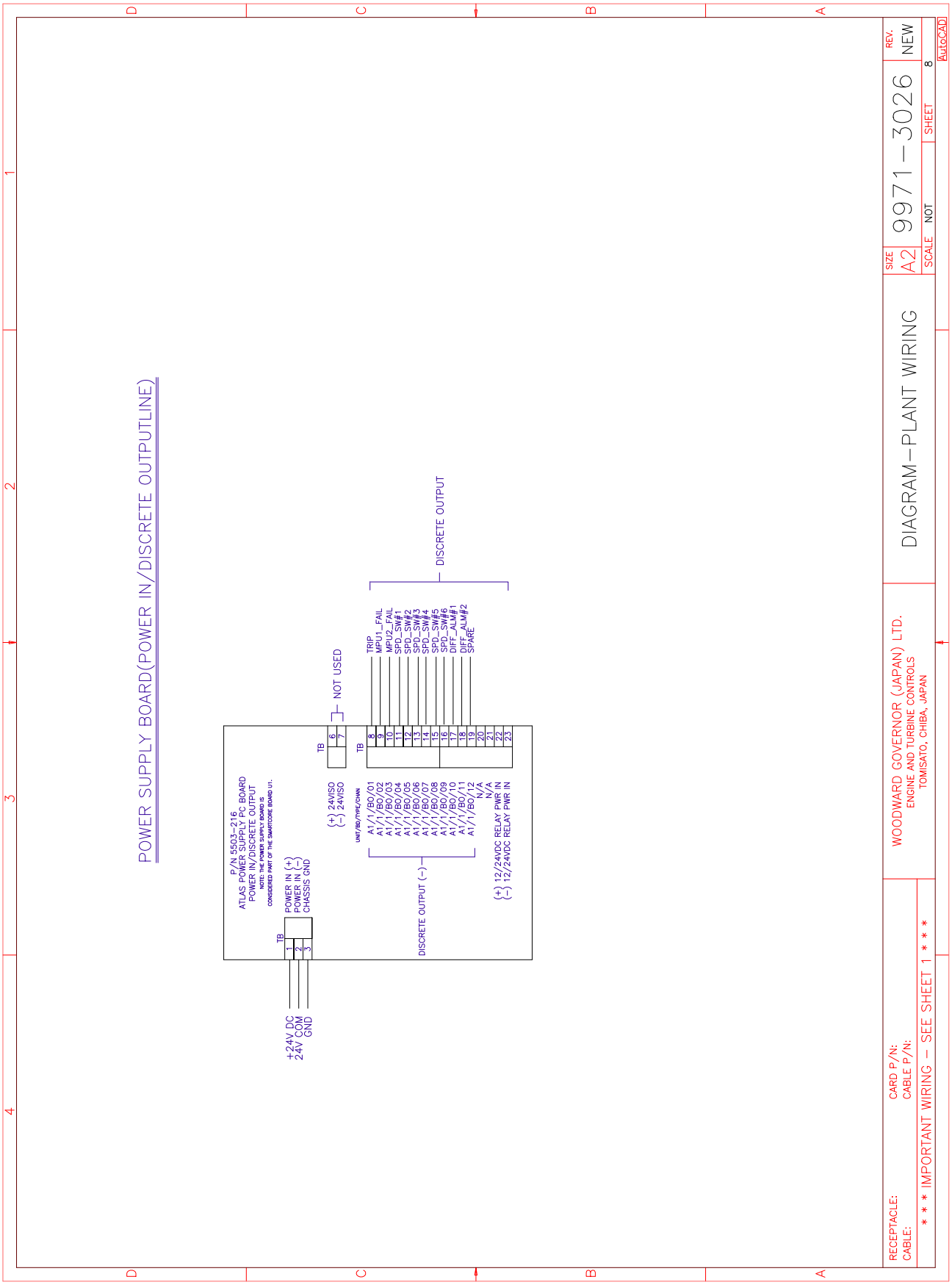

TOP VIEW
SMARTCORE BOARD
1~8
9~16
17~26
27~38
39~50
51~58
POWER SUPPLY BOARD
1~3
24VDC
ATLAS SC (P/N 8273-040)
WOODWARD
NAMEPLATE
W1
TO PC
BOTTOM VIEW
POWER SUPPLY BOARD
TB6
8~15
16~23
SMARTCORE BOARD
59~70
71~82
83~92
93~102
DIAGRAM-PLANT WIRING
WOODWARD GOVERNOR (JAPAN) LTD.
ENGINE AND TURBINE CONTROLS
TOMISATO, CHIBA, JAPAN
SIZE A2
9971-3026
REV. NEW
SCALE NOT
SHEET 3
AutoCAD
RECEPTACLE:
CABLE:
CARD P/N:
CABLE P/N:
* * * IMPORTANT WIRING - SEE SHEET 1 * * *


SMARTCORE BOARD (DISCRETE INPUT)
P/N 5503-293
ATLAS SMARTCORE BOARD
DISCRETE INPUT
UNIT/BD/TYPE/CHAN
TB
24VDC INPUT
A1/1/DI/1
A1/1/DI/2
A1/1/DI/3
A1/1/DI/4
A1/1/DI/5
A1/1/DI/6
A1/1/DI/7
A1/1/DI/8
A1/1/DI/9
A1/1/DI/10
A1/1/DI/11
A1/1/DI/12
A1/1/DI/13
A1/1/DI/14
A1/1/DI/15
A1/1/DI/16
A1/1/DI/17
A1/1/DI/18
A1/1/DI/19
A1/1/DI/20
A1/1/DI/21
A1/1/DI/22
A1/1/DI/23
A1/1/DI/24
(-) I_GND
(+) 24VISO
FAILSAFE OVERRIDE
RESET
SPARE
NOT USED
COMMON
WOODWARD GOVERNOR (JAPAN) LTD.
ENGINE AND TURBINE CONTROLS
TOMISATO, CHIBA, JAPAN
DIAGRAM-PLANT WIRING
SIZE A2
9971-3026
REV. NEW
SCALE NOT
SHEET 4
RECEPTACLE:
CABLE:
CARD P/N:
CABLE P/N:
* * * IMPORTANT WIRING - SEE SHEET 1 * * *
AutoCAD


SMARTCORE BOARD (ANALOG INPUT / SPEED INPUT)
P/N 5503-293
ATLAS SMARTCORE BOARD
ANALOG INPUT / SPEED INPUT
UNIT/BD/TYPE/CHAN
TB
VOLTAGE IN (+)
CURRENT IN (+)
INPUT (-)
SHLD
ANLOG INPUT A1/1/AI/01
ANLOG INPUT A1/1/AI/02
ANLOG INPUT A1/1/AI/03
ANLOG INPUT A1/1/AI/04
ANLOG INPUT A1/1/AI/05
ANLOG INPUT A1/1/AI/06
SPEED INPUT A1/1/SS/01
SPEED INPUT A1/1/SS/02
MPU (+)
PROX (+)
IN (-)
SHLD
MPU (+)
PROX (+)
IN (-)
SHLD
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
MPU#1
MPU#2
DIAGRAM-PLANT WIRING
WOODWARD GOVERNOR (JAPAN) LTD.
ENGINE AND TURBINE CONTROLS
TOMISATO, CHIBA, JAPAN
SIZE A2
9971-3026
REV. NEW
SCALE NOT
SHEET 5
AutoCAD
RECEPTACLE:
CABLE:
CARD P/N:
CABLE P/N:
* * * IMPORTANT WIRING - SEE SHEET 1 * * *


SMARTCORE BOARD (ACTUATOR OUTPUT / ANALOG OUTPUT)
P/N 5503-293
ATLAS SMARTCORE BOARD
ANALOG INPUT / ACTUATOR
UNIT/BD/TYPE/CHAN
ACTUATOR OUTPUT A1/1/ACT/01
ACTUATOR OUTPUT A1/1/ACT/02
ANLOG OUTPUT A1/1/AO/01
ANLOG OUTPUT A1/1/AO/02
ANLOG OUTPUT A1/1/AO/03
ANLOG OUTPUT A1/1/AO/04
ANLOG OUTPUT A1/1/AO/05
ANLOG OUTPUT A1/1/AO/06
CURRENT OUT (+)
OUTPUT (-)
SHLD
TB
59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82
SPARE
SPARE
TACHOMETER OUTPUT#A(4-20mA)
TACHOMETER OUTPUT#B(4-20mA)
#1 MPU SPEED(4-20mA)
#2 MPU SPEED(4-20mA)
SPARE
SPARE
RECEPTACLE:
CABLE:
CARD P/N:
CABLE P/N:
* * * IMPORTANT WIRING - SEE SHEET 1 * * *
WOODWARD GOVERNOR (JAPAN) LTD.
ENGINE AND TURBINE CONTROLS
TOMISATO, CHIBA, JAPAN
DIAGRAM-PLANT WIRING
SIZE A2
9971-3026
SCALE NOT
SHEET 6
REV. NEW
AutoCAD


SMARTCORE BOARD (SERIAL PORTS)
P/N 5503-293
ATLAS SMARTCORE BOARD
SERIAL PORTS
UNIT/RBD/TYPE/CHAN
TB
93
94
95
96
97
98
99
100
101
102
83
84
85
86
87
88
89
90
91
92
RS-232 TXD
RS-232 RXD
RS-232 M1 GND
RS-485/422 TRANSMIT(+)
RS-485/422 TERM RES.(+)
RS-485/422 TERM RES.(-)
RS-422 TRANSMIT(+)
RS-422 TRANSMIT(-)
RS-422 TRANSMIT SHLD
SERIAL PORT A1/1/PORT/01
RS-232 TXD
RS-232 RXD
RS-232 M1 GND
RS-485/422 TRANSMIT(+)
RS-485/422 TERM RES.(+)
RS-485/422 TERM RES.(-)
RS-422 TRANSMIT(+)
RS-422 TRANSMIT(-)
RS-422 TRANSMIT SHLD
SERIAL PORT A1/1/PORT/02
NOT USED
PIN
1
2
3
4
5
6
7
8
9
(9-PIN FEMALE D-SUB)
NOT CONNECTED
RS-232 RXD
RS-232 TXD
NOT CONNECTED
RS-232 SIG GND
NOT CONNECTED
NOT CONNECTED
NOT CONNECTED
SERIAL PORT A1/1/PORT/03
TO RS-232TXD
TO RS-232RXD
TO SIG GND
SERVLINK PORT (WATCH WINDOW COMMUNICATION) (RS-232C)
DIAGRAM-PLANT WIRING
WOODWARD GOVERNOR (JAPAN) LTD.
ENGINE AND TURBINE CONTROLS
TOMISATO, CHIBA, JAPAN
SIZE A2
9971-3026
REV. NEW
SCALE NOT
SHEET 7
AutoCAD
RECEPTACLE:
CABLE:
CARD P/N:
CABLE P/N:
* * * IMPORTANT WIRING - SEE SHEET 1 * * *


POWER SUPPLY BOARD(POWER IN/DISCRETE OUTPUTLINE)
P/N 5503-216
ATLAS POWER SUPPLY PC BOARD
POWER IN/DISCRETE OUTPUT
NOTE: THE POWER SUPPLY BOARD IS
CONSIDERED PART OF THE SMARTCORE BOARD U1.
TB
1
2
3
POWER IN (+)
POWER IN (-)
CHASSIS GND
+24V DC
24V COM
GND
TB
6
7
(+) 24VISO
(-) 24VISO
NOT USED
TB
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
UNIT/BD/TYPE/CHAN
A1/1/BO/01
A1/1/BO/02
A1/1/BO/03
A1/1/BO/04
A1/1/BO/05
A1/1/BO/06
A1/1/BO/07
A1/1/BO/08
A1/1/BO/09
A1/1/BO/10
A1/1/BO/11
A1/1/BO/12
N/A
N/A
DISCRETE OUTPUT (-)
(+) 12/24VDC RELAY PWR IN
(-) 12/24VDC RELAY PWR IN
TRIP
MPU1_FAIL
MPU2_FAIL
SPD_SW#1
SPD_SW#2
SPD_SW#3
SPD_SW#4
SPD_SW#5
SPD_SW#6
DIFF_ALM#1
DIFF_ALM#2
SPARE
DISCRETE OUTPUT
RECEPTACLE:
CABLE:
CARD P/N:
CABLE P/N:
* * * IMPORTANT WIRING – SEE SHEET 1 * * *
WOODWARD GOVERNOR (JAPAN) LTD.
ENGINE AND TURBINE CONTROLS
TOMISATO, CHIBA, JAPAN
DIAGRAM–PLANT WIRING
SIZE
A2
9971–3026
REV.
NEW
SCALE NOT
SHEET 8
AutoCAD

AtlasSC™ Specifications

Input Voltage Range	18 ~ 32 Vdc (24Vdc nominal)
Input Power	35 W (nominal)
	I/O Signals
MPU inputs (2)	100Hz ~ 24950kHz（Input voltage > 1 Vrms）
Discrete inputs (2)	Input voltage = 24 Vdc, Input current = 10mA (nominal)
Analog outputs (4)	4-20mA
Relay outputs (11)	
Serial port for Watch Window communication	RS-232, 9 pin sub D connector, 57600 baud
	Accuracy
Trip Accuracy	Overspeed trip point ± 4 Hz. when Input frequency is less than 5000 Hz and the operating temperature is 25 degree C.
Trip response time	25 millisecond max.
	Environmental Specifications
Operating Temperature	–20°C ~ +70°C（–4°F ~ +158°F）
Storage Temperature	–40°C ~ +105°C（–40°F ~ +221°F）
EMI/RFI	EN 50021
Humidity	MIL-STD- 810C, Method 516.2, Procedure I
Vibration	SAE J1455 (8.2 Grms 10-2000 Hz)
Shock	US MIL-STD-810C, 516.2-2 (30 g, 11 ms, 1/2 sine)

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We appreciate your comments about the content of our publications.

Please send comments to:

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Certification

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2008/08/Makuhari