The Americas YASKAWA Representative

- 24-hour Telephone Number: **(937) 847-3200**
  Use for urgent or emergency needs for technical support, service and/or replacement parts
- Routine Technical Inquiries: *techsupport@motoman.com*
  Allow up to 36 hours for response

YASKAWA

YASKAWA SMART SERIES HC10/HC20 COLLABORATIVE ROBOT QUICK START GUIDE

WITH SMART PENDANT AND YRC1000micro

Upon delivery of the product and prior to operation, read all included instructions thoroughly, and retain for future reference.

Have the following information available when contacting the YASKAWA Representative:

- System
- Primary Application
- Software Version *(Located on Programming Pendant by selecting: {Main Menu} - {System Info} - {Version})*
- Warranty ID *(Located on Robot Controller)*
- Robot Serial Number *(Located on Manipulator data plate)*
- Robot Sales Order Number *(Located on Robot controller data plate)*

MANUAL NO.
188791-1③

Copyright

Printed in the United States of America

First Printing, 2019

YASKAWA America, Inc.
Motoman Robotics Division
100 Automation Way
Miamisburg, OH 45342
Phone: 937-847-6200

www.motoman.com

Notes for Safe Operation

Read all included manuals carefully before installing, operating, maintaining, or inspecting the system.

In this instruction, Safe Operations are classified as “DANGER”, “WARNING”, “CAUTION” or “NOTICE”.

DANGER	Indicates an imminently hazardous situation which, if not avoided, **WILL result in death or serious injury**.
WARNING	Indicates a potentially hazardous situation which, if not avoided, **MAY result in death or serious injury**.
CAUTION	Indicates a hazardous situation, which if not avoided, **MAY result in minor to moderate injury**.
CAUTION	Indicate a situation which if not avoided **may result in equipment damage.**
NOTICE	Indicates **practices not related to personal injury**.

Registered Trademark

In this manual, names of companies, corporations, or products are trademarks, registered trademarks, or bland names for each company or corporation. The indications of ® and ™ are omitted.

1 General Information

1.1 Introduction

This is a YASKAWA Smart Series HC10/HC20 Collaborative Robot Quick Start Guide for Robots that have Smart Pendant Version 2.0 and newer.

This document is intended to guide the user through a basic installation and setup of the Robot and the user to perform basic moves to confirm setup was successful. A complete set of manuals is provided and are to be reviewed by all working with or near the Robot.

1.2 Safety

Before installing and powering on the Robot, be sure to read and understand all safety information. Refer to the safety sections of all included manuals. All YASKAWA manuals are included on a USB.

Additional manuals can be downloaded from

- *https://smart.motoman.com/en-us/resources/documentation*

or

- scanning the below QR code

HC10 **HC20**

1.3 Training

YASKAWA recommends users complete the free online courses listed below before proceeding to the next sections:

– Intro to Robotics

– Yaskawa Safety Principles

– HC10/HC20 w/wo DT YRC1000micro Controller

1.3.1 How to Access Free Online Training

1. Go to “YASKAWA Academy Catalog” *https://yaskawaacademy.myabsorb.com/#/catalog/*
2. Press the {$0.00} located underneath each of the desired courses to add them to the “Cart”
3. Review the items in the Cart and press {Proceed to Checkout}
4. Follow instructions to “Sign In” or “Sign Up”
   - An activation link is sent to the email address on file, if signing up for the first time
5. Enrolled courses can be found in “My Courses” on the dashboard, or at *https://yaskawaacademy.myabsorb.com/#/courses*
6. Use {Start} to begin the course

2 Setup HC10/HC20 Smart Series Robot

2.1 Unboxing and Installation

Refer to the instructions for unboxing, mounting, and cable connections for the HC10/HC20 at:

- *https://www.motoman.com/en-us/setup/hc10*

OR

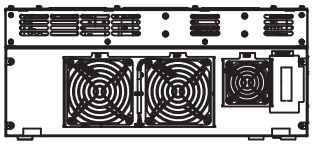
- *https://www.motoman.com/en-us/products/setup/hc20xp*

2.2 Robot Controller Installation

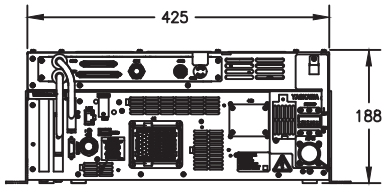
The Robot Controller can be installed in a 19 inch server rack with compatible hardware (not included).

Refer to *chapter 3 Installation in the YRC1000micro INSTRUCTIONS* for detailed instructions on Robot Controller installation.

Fig. 2-1: Robot Controller Dimensions

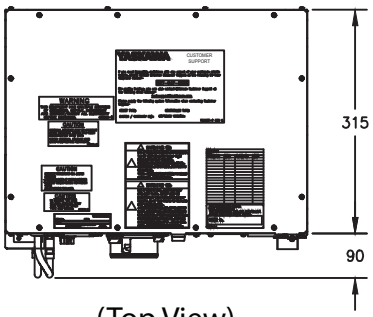


(Back View)



(Front View)

425W x 188H x 405D



(Top View)

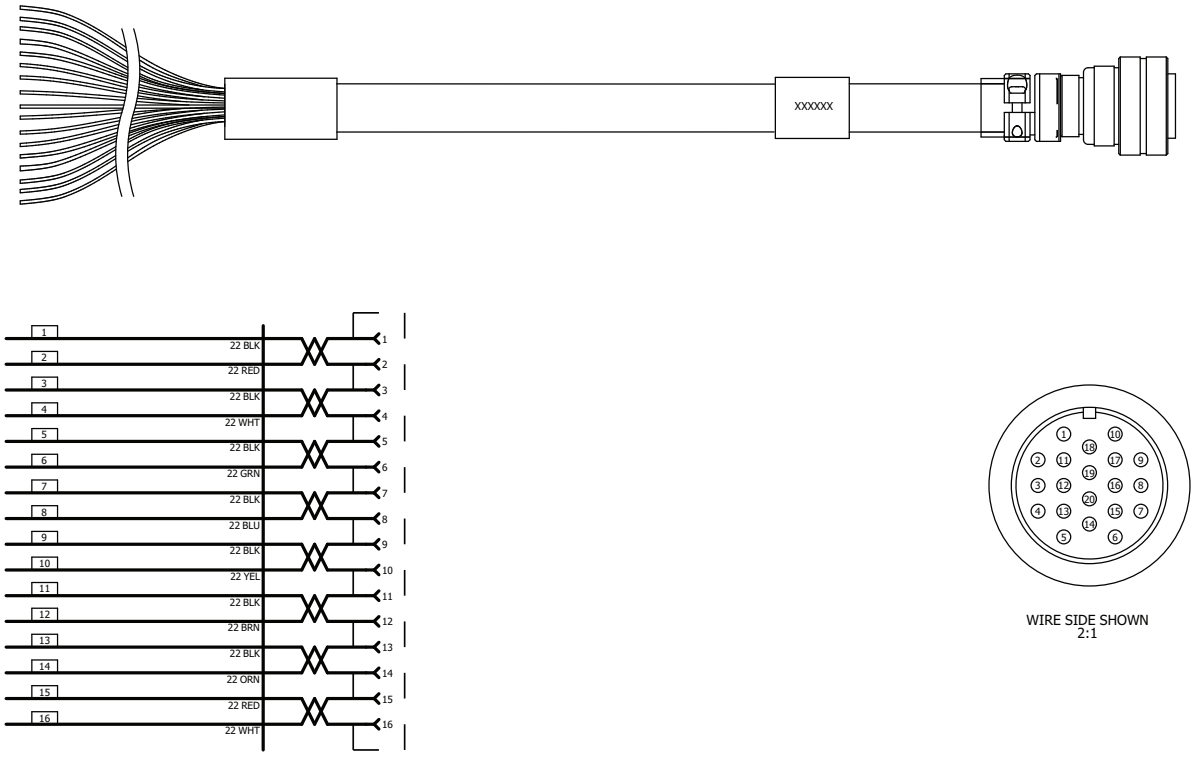
2.3 Wiring External Devices

2.3.1 Reference Material

Refer to the following manual and figures for detailed instruction on how to wire external devices to the YRC1000micro controller.

– *YRC1000micro Option Supplement for I/O Configuration for Breakout Board*

Fig. 2-2: Base I/O Cable Assembly



2.4 Power ON

WARNING

- Perform a risk assessment of the Robot and application before powering ON the Robot.

Not performing a risk assessment before Powering ON the Robot may result in death or serious injury.

The main power supply is turned ON when the Robot Controller's [POWER] switch is flipped to the "ON" position. After a few seconds, the startup screen appears on the Smart Pendant.

Fig. 2-3: Robot Controller Power Switch

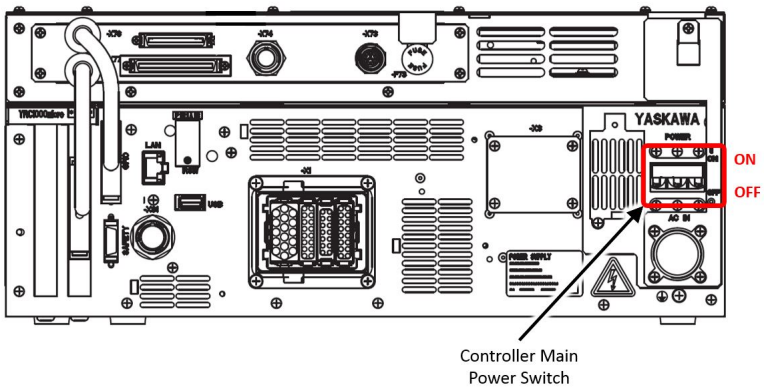


Fig. 2-4: Smart Pendant Startup Screen

If the Smart Pendant does not complete the startup sequence due to an error (e.g. Robot Controller Software incompatibility), an {Export Logs} button appears. Use the {Export Logs} button to save internal logs to a USB storage device that is inserted in the Smart Pendant to aid with troubleshooting by a YASKAWA representative.

Once the startup sequence completes, the Smart Pendant displays the Home screen.

Fig. 2-5: Smart Pendant Home Screen

If contacting a YASKAWA representative, gather all software version information. The software versions are available on the Smart Pendant after starting the Robot:

1. Select {MENU} ⟶ {System Settings} to view the systems “General and Controller Settings”.
2. Notice the software versions for the Smart Pendant and Robot Controller appear.

Fig. 2-6: Robot Controller and Smart Pendant Software Version

2.5 Power OFF

To safely power the system down, turn servos OFF on the Smart Pendant. Next, flip the Robots Controller's [POWER] switch to the "OFF" position, shown in *Fig. 2-3*.

- For more details concerning powering ON/OFF and start up of the Robot, refer to the *chapter 5 Turning ON and OFF the Power Supply of the YRC1000micro INSTRUCTIONS.*
- More details on the Smart Pendant are available in the *YRC1000/ YRC1000micro INSTRUCTIONS FOR Smart Pendant.*

3 Factory Settings

WARNING

- Review the factory settings and modify them per the application and risk assessment requirements prior to moving the Robot and programming a job.

Not modifying the factory settings per the application and risk assessment requirements may result in death or serious injury.

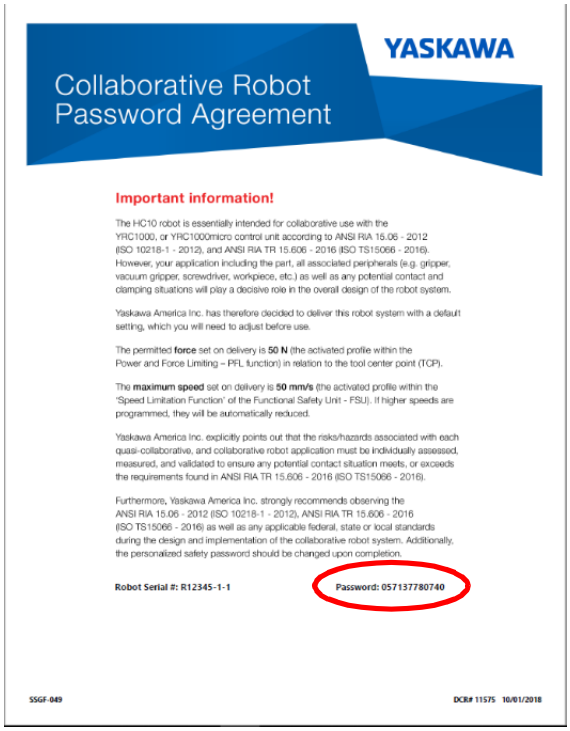
The factory force and speed settings are set very low to reduce the risk of improper operation.

- **Power and Force Monitoring Function (PFL)** - Monitors the external force acting on the Robot and performs a protective stop of the Robot if the external force exceeds the user-defined setting. For more information on PFL, see *"PFL Function" on page 5-5*.
- **Speed Limit Function** - Limits operating speed (Tool Center Point (TCP) speed) of the robot. This TCP Speed Limit will override higher speed(s) programmed in a running Robot job. The TCP speed also defines the maximum speed the Robot can be jogged.

Table 3-1: Robot Factory Settings

PFL Mode	ON
TCP Speed Limit	75 mm/s
PFL Force Monitor in Relation to TCP	100N

An envelope with a personalized safety password (in the lower-right corner of Collaborative Robot Password Agreement) is required to edit/ create Safety Setting(s). Review the Terms and Conditions included in the agreement before modifying the factory settings.


YASKAWA

Collaborative Robot Password Agreement

Important information!

The HC10 robot is essentially intended for collaborative use with the YRC1000, or YRC1000micro control unit according to ANSI RIA 15.06 - 2012 (ISO 10218-1 - 2012), and ANSI RIA TR 15.606 - 2016 (ISO TS15066 - 2016). However, your application including the part, all associated peripherals (e.g. gripper, vacuum gripper, screwdriver, workpiece, etc.) as well as any potential contact and clamping situations will play a decisive role in the overall design of the robot system.

Yaskawa America Inc. has therefore decided to deliver this robot system with a default setting, which you will need to adjust before use.

The permitted **force** set on delivery is **50 N** (the activated profile within the Power and Force Limiting – PFL function) in relation to the tool center point (TCP).

The **maximum speed** set on delivery is **50 mm/s** (the activated profile within the 'Speed Limitation Function' of the Functional Safety Unit - FSU). If higher speeds are programmed, they will be automatically reduced.

Yaskawa America Inc. explicitly points out that the risks/hazards associated with each quasi-collaborative, and collaborative robot application must be individually assessed, measured, and validated to ensure any potential contact situation meets, or exceeds the requirements found in ANSI RIA TR 15.606 - 2016 (ISO TS15066 - 2016).

Furthermore, Yaskawa America Inc. strongly recommends observing the ANSI RIA 15.06 - 2012 (ISO 10218-1 - 2012), ANSI RIA TR 15.606 - 2016 (ISO TS15066 - 2016) as well as any applicable federal, state or local standards during the design and implementation of the collaborative robot system. Additionally, the personalized safety password should be changed upon completion.

Robot Serial #: R12345-1-1 **Password: 05713778074O**

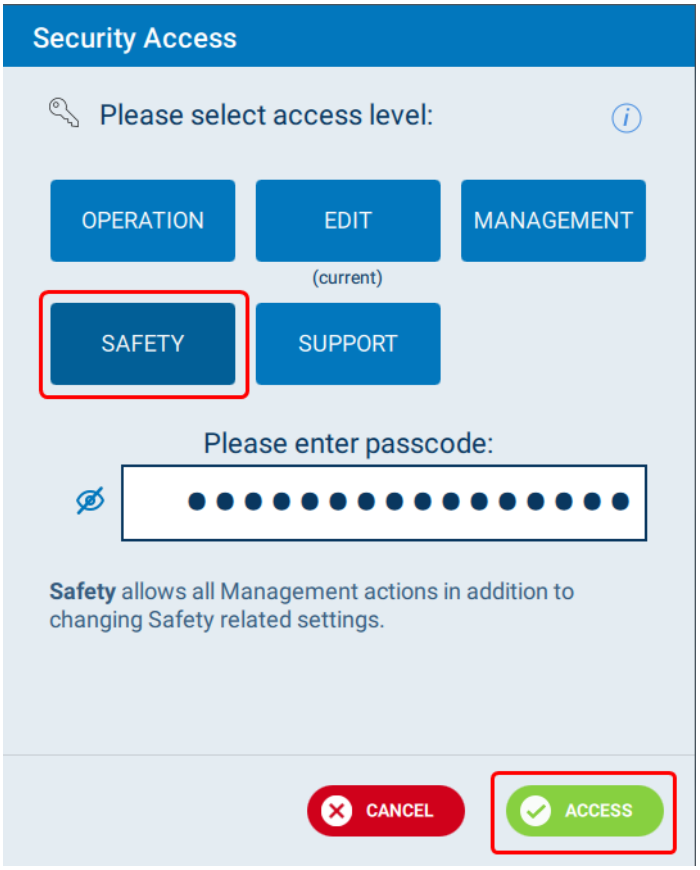
SSGF-049 DCR# 11575 10/01/2018

3.1 Modifying Factory Settings

NOTICE

"Safety" Access Level is required to edit Safety Settings.

1. Select {MENU} ⟶ {Security: Edit} to open the Security Access pop-up.
2. Select the {SAFETY} access level
3. Enter the personalized safety password, found in the included envelope.
4. Press {ACCESS}



NOTICE

Passwords can be changed on the Smart Pendant from

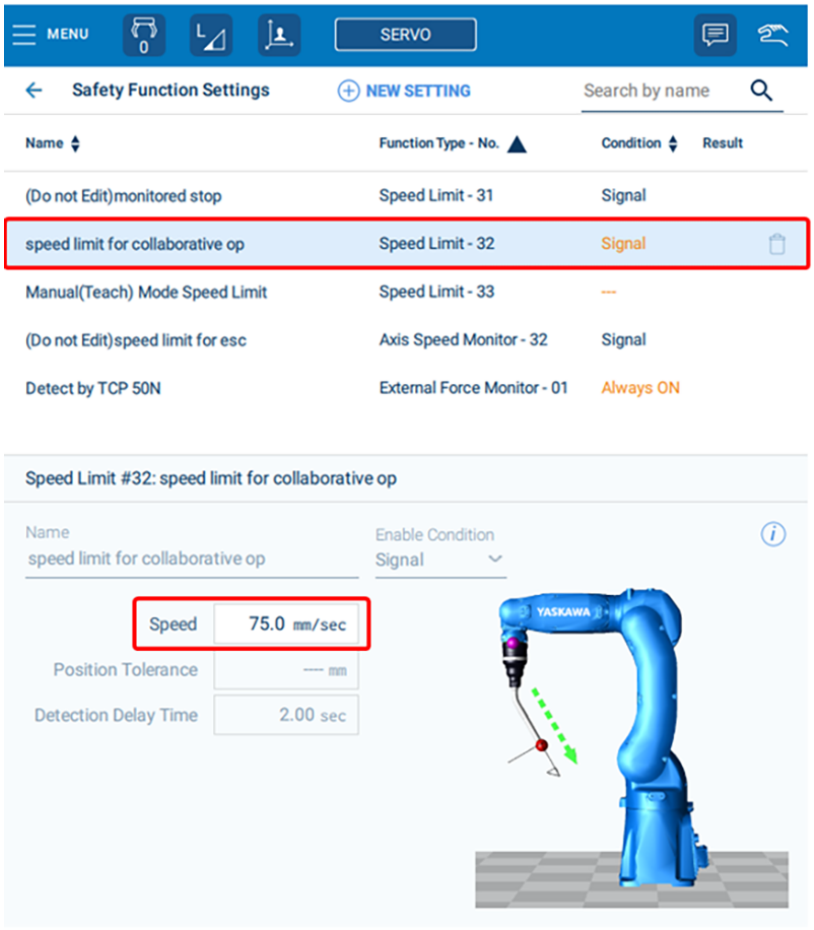
{Menu} ⟶ {System Settings} ⟶ {General}.

Follow the notifications and instructions for each access level.

3.1.1 Changing TCP Speed

Complete *section 3.1* before to changing the TCP Speed.

1. Select {MENU} ⟶ {Safety Settings} ⟶ {Safety Functions}.

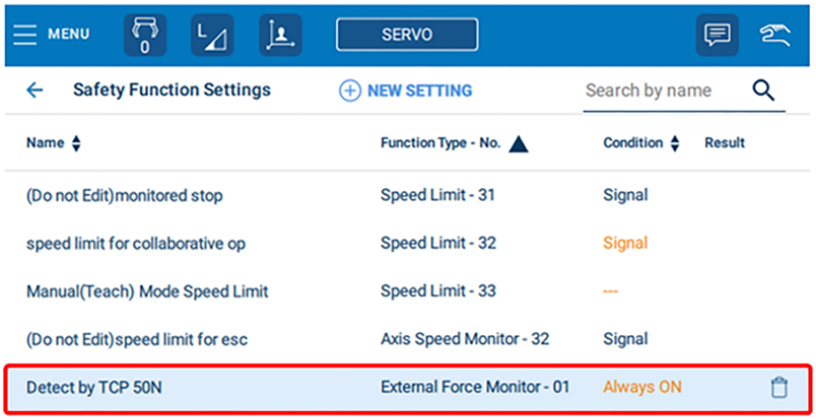


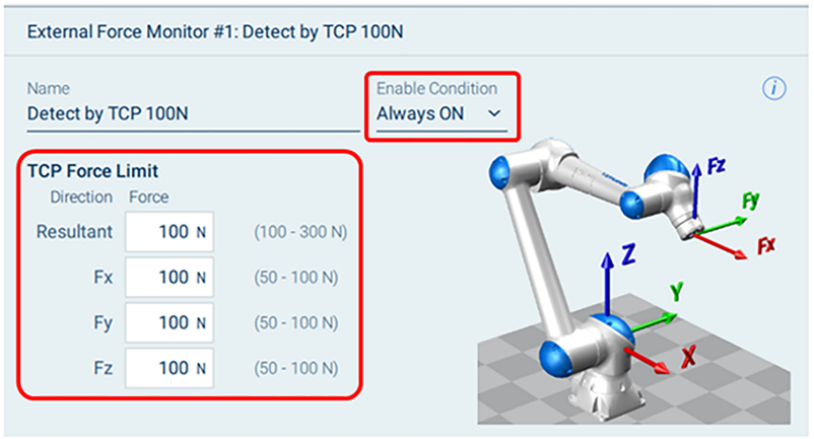
2. Highlight the Speed Limit file for collaborative operation.
3. Enter the TCP “Speed” on the numeric keypad that satisfies the risk assessment and press {READBACK}.
4. Press {WRITE} to save the new data.

3.1.2 Changing PFL Settings

Complete *section 3.1* before changing the PFL External Force Monitor Settings.

1. Select {MENU} ⟶ {Safety Settings} ⟶ {Safety Function}
2. Highlight the External Force Monitor file.





3. Enter new value(s) for Resultant and XYZ “Forces” that satisfy the risk assessment.

NOTICE

- Refer to *section 1.17 Security Level Setting of the YRC1000/ YRC1000micro INSTRUCTIONS FOR Smart Pendant*, for more details on the security settings.
- Refer to *section 3.2 for Basic Settings for Collaborative Operation* for more detail on these factory settings.

3.2 Torque Sensor Calibration

Calibrate the collaborative robot's torque sensors (one in each axis) after installing system for safe operation. Perform calibration in any robot posture, with or without mounting a tool.

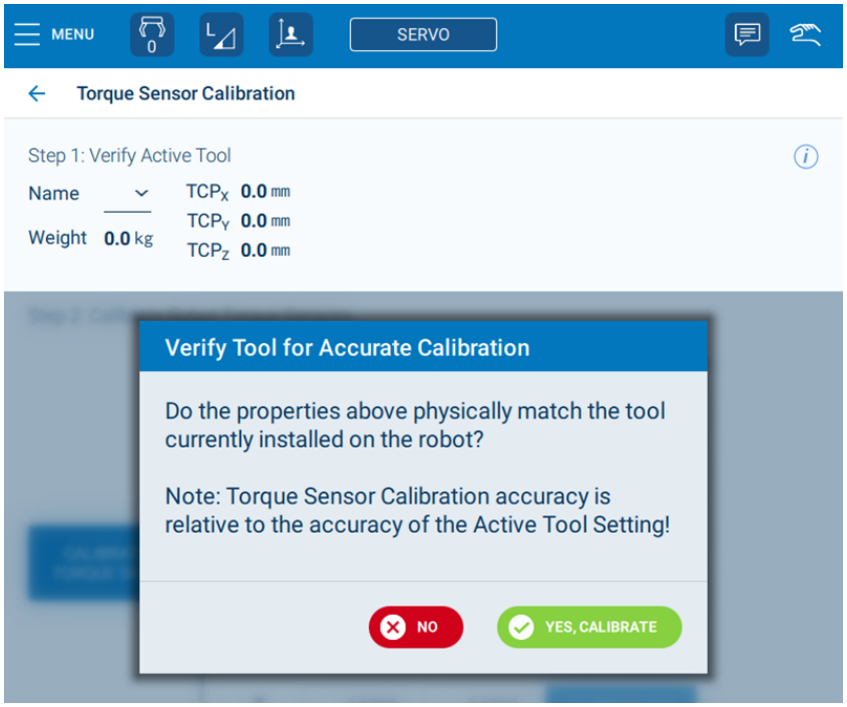
Calibrate the MOTOMAN Collaborative robot by:

1. Select {MENU} ⟶ {Safety Settings} ⟶ {Torque Sensor Calibration}

NOTICE

- Before calibrating, the user must verify the system's “Active Tool”. For initial calibration, this guide assumes the installation of no tool and the Active Tool #0 has a weight and TCP set to all “0”'s.
- A pop-up appears during *step 2* to remind the user that Active Tool properties affects the accuracy of the resulting calibration

Fig. 3-1: .Verify Tool for Accurate Calibration Popup.



2. Select one of the following methods to calibrate torque sensor offset value(s) after verifying the Active Tool setting:
   – Edit(s) to this panel will display buttons to finalize the process -
      • {Readback} allows the user to read data from both the Robot Controller and PFL safety board.
      • {Cancel} allows the user to abort editing.

Ⓐ Standard Option: All Axes Update

Press {Calibrate All Torque Sensors} to update all torque sensor offset values. This method is recommended for most cases.

Ⓑ Advanced Option: Single Axis Update

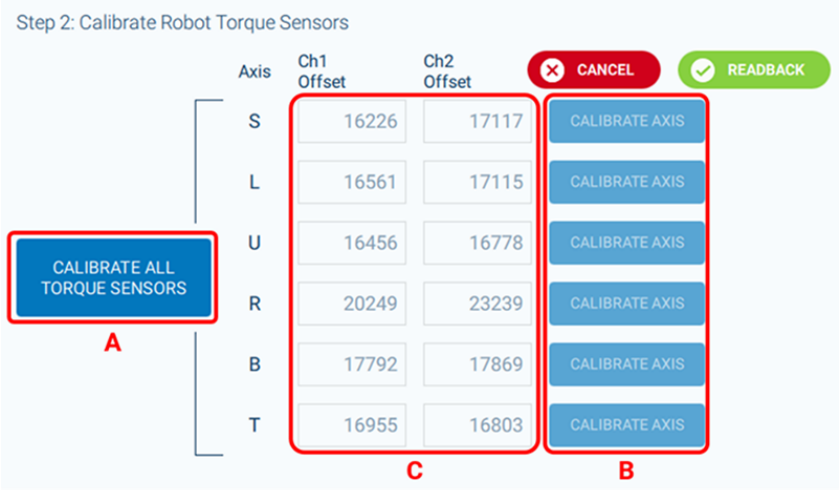
Press {Calibrate Axis} to update the torque sensor offset values of a single axis.

• *Example:* If swapping a tool for one with different physical properties, the T-axis torque sensor may drift due to significant changes of the attached load. Thus, the T-Axis can be calibrated individually.

Ⓒ Advanced Option: Manual Update

Enter offset values manually. This method may be used if the Robot Controller or its internal boards (i.e. CPU or PFL) are replaced and the previously recorded offset values are available.

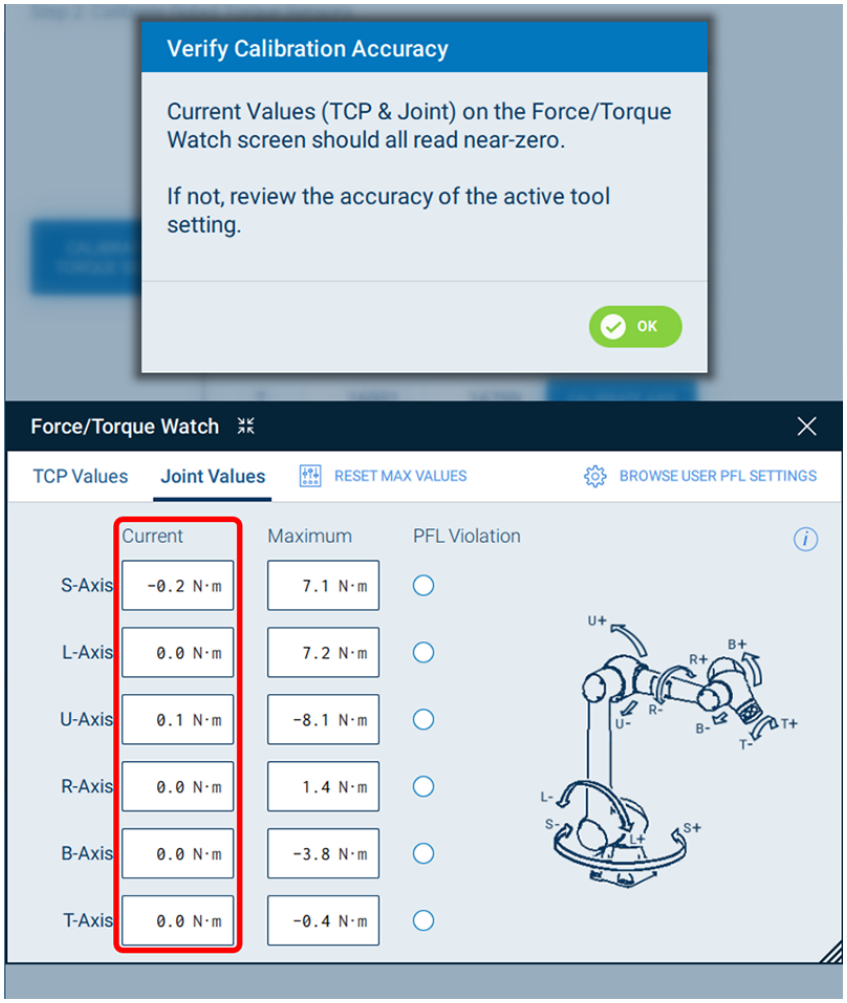
Fig. 3-2: Torque Sensor Calibration



3. Press {Readback}
   – {Write} and a “Display” control appears
   • Display options are provided for viewing readback data:
      • Edit value: shows values entered by user.
      • Readback Value (PFL): shows temporary values saved on the PFL board
      • Comparison Result: (default)
4. Check the “Readback” result.
   – Make sure the “Comparison Result” values match
   • If value(s) differ, the “Comparison Result” displays as ***. At this point, check to see which value(s) did not update.

5. Press {Write} to finalize the calibration process.
6. Press {Verify Calibration} with Servos ON.
   – This opens the Force/Torque Watch screen
   • All “Current values” should be minimal (e.g. < 10) if the calibration was performed with an Active Tool that reflects the currently installed tool.

Fig. 3-3: Torque Calibration Accuracy



3.2.1 Verifying Torque Sensor Readings

CAUTION

Re-calibrate the robot's torque sensors if any abnormalities related to the operation of the PFL function(s) occur.

Torque sensor readings can drift due to environmental changes, accidental collisions between the robot and its surroundings, or general misuse.

Use the {MENU} ⟶ {Safety Settings} ⟶ {Force/Torque Watch} screen to verify the calibration.

If the “Current” joint torque values exceed one or multiple values in the table below, the error in calculated external force increases and PFL functionality is negatively impacted. Thus, a re-calibration of torque sensor offset data is required.

Axis	S	L	U	R	B	T
HC10	27.0 Nm	27.0 Nm	12.0 Nm	3.0 Nm	3.0 Nm	3.0 Nm
HC20	72.0 Nm	96.0 Nm	48.0 Nm	27.0 Nm	12.0 Nm	12.0 Nm

4 Start Using the Robot

4.1 Jogging

Jogging is the most commonly used operation for the Robot. To satisfy the needs under different situations, YASKAWA provides features to help the user to complete the work safely and efficiently.

Most jogging features are found on the Robot Jog Panel. The Jog Panel is available from the Job Editing screen by pressing {JOGGING} on the bottom navigation bar and can only be done in Manual (Teach) mode.

4.1.1 Common Features of the Robot Job Panel

① Jogging Mode	③ Active Tool	⑤ Current Axis Status Panel
② Jog Speed	④ Toggle Tool	⑥ Go To Point Button

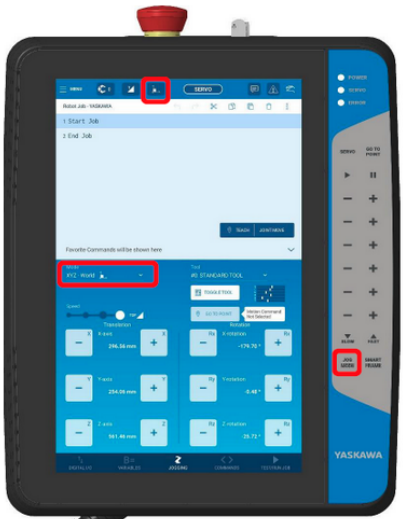
① Jogging Mode

Control for selecting the jogging mode (Manual (Teach) mode). The Smart Pendant supports six types of Coordinate Frames:

- **Smart Frame:** Moves the Robot in Cartesian directions relative to where the Smart Pendant is with respect to the Robot
- **Joint:** Moves each joint axis independently
- **XYZ-World:** Moves the Robot in Cartesian directions relative to the Robot base
- **XYZ-Tool:** Moves the Robot in Cartesian directions relative to the tool
- **XYZ-User:** Moves the Robot in Cartesian directions relative to a user frame
- **Hand Guiding:** Moves the Robot by applying a force to the Robot arm using hands instead of the Smart Pendant controls.

The Coordinate Frame can be selected by three different ways:

- Icon on Status Bar
- Robot Jog Panel
- Membrane Key



② Jog Speed

The Smart Pendant provides four levels of speed. For safety reasons, the default speed is set to “Low”. Select the desired speed prior to jogging:

NOTICE

- A Speed Limit Setting labeled “Manual (Teach) Mode” defines the upper limit for jogging speed.
- If the Robot moves too slow when set to Top or High speeds for jogging the Robot, review the Speed Limit Safety file settings and adjust per safety requirements. See *section 3.1.1 “Changing TCP Speed” on page 3-3*.

There are three ways to select the jogging speed of operation:

- Status Bar

- Robot Jog Panel

- [SLOW] and [FAST] membrane keys

Review *chapters 2 through 5 of the YRC1000/YRC1000micro INSTRUCTIONS FOR Smart Pendant* for detailed descriptions for programming and operating the Robot.

5 Troubleshooting and Support

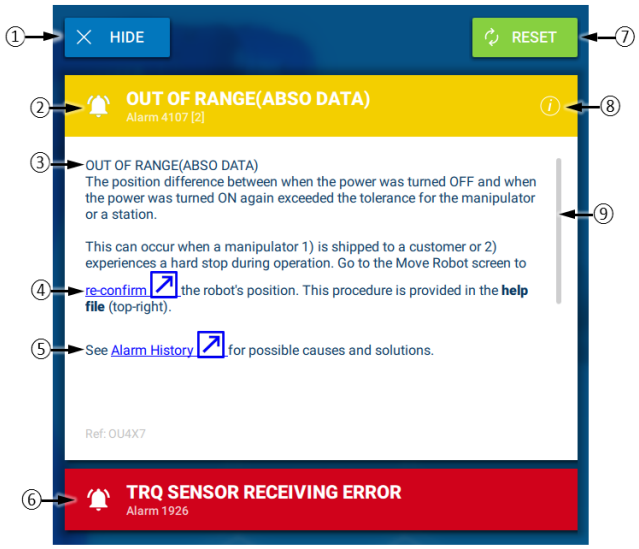
Alarms display when an instruction cannot be processed. One or multiple alarms can occur at once. If multiple alarms exist, all pop-ups are shown in a scrollable list. An overview of the alarm layout is provided below. If an alarm occurs during operation, the Robot stops immediately and the ALARM pop-up window appears on the Smart Pendant. All previous alarms can be viewed on the Alarm History screen.

Go to {MENU} ⟶ {Alarms}

- For a general description of Robot alarms, refer to *chapter 14 Alarm of the YRC1000/YRC1000micro INSTRUCTIONS FOR Smart Pendant.*

ALARM:4107 “OUT OF RANGE (ABSO DATA)

This is the most common alarm that occurs if the Robot determines there is a significant difference in the encoder data (pulse) between power off and power on. Most commonly this is caused by transportation conditions due to the Robot being packed and shipped and the user receiving and unpacking the Robot.



① **Hide Button:** Allows the user to hide the alarm to continue performing restricted operations on the Smart Pendant

② **Alarm Title:** Contains the alarm title, code, and subcode. The title bar is also color coded (yellow = minor alarm, red = major alarm).

③ **Alarm Details:** Contains why the alarm happened and possible solutions.

④ **Help Links:** Links located in alarm details will direct the user to screen(s) with actions required to resolve the alarm.

⑤ **Alarm History:** Directs the user to the Alarm History screen

⑥ **Multiple Alarms:** If multiple alarms are active, the subsequent alarms will appear collapsed in list form. Press the alarm title to expand the alarm to view its contents.

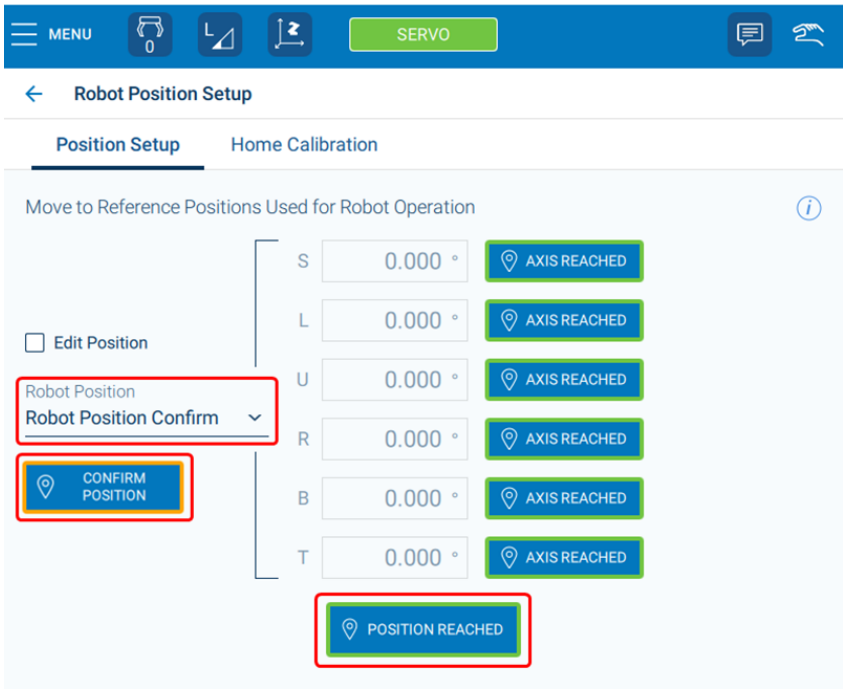
⑦ **Reset Button:** Allows the user to reset a Minor alarm. Major alarms cannot be reset.

⑧ **Help Icon:** Some alarms require background information to fully understand the problem. This information will be contained in a help file visible in the Alarm Title (top-right).

⑨ **Scrollbar:** If the alarm details are long, a scrollbar will appear to allow the user to read all content.

To solve ALARM:4107 “OUT OF RANGE (ABSO DATA)”, perform the following:

1. Place the Robot Controller in “Management Mode”.
   – Refer to *section 3.1 on page 3-2*
2. Press {X HIDE} to conceal the alarm screen.
3. Press {SERVO ON/READY} in TEACH mode.
4. Select {MENU} ⟶ {Robot Settings} ⟶ {Robot Configuration}
5. On the “Robot Configuration” tab, select “Robot Position Confirm” from the “Target Position” dropdown list.



6. Press {MOVE TO POSITION} to reach the target confirmation position.
7. Use the {Confirm} button with an orange border to validate the robot's position.
8. Observe message in the button changes to “CONFIRM POSITION”, press the button to confirm and a message displays confirming this action.

■ **Robot Behavior near a Singularity**

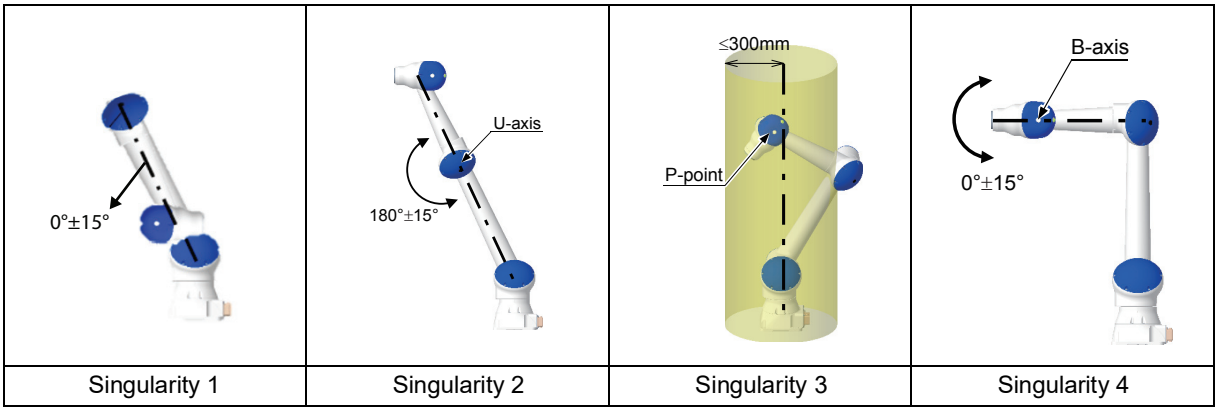
With collaborative operation enabled, the behavior of the robot near a singularity is limited to single axis moves (i.e. no move(s) that involve simultaneous motion of multiple axes).

An attempt to operate the multiple robot axes simultaneously, in any operation mode, results in alarm 6002 “NEAR SINGULARITY (PFL).”

HCxx and HCxxDT have the following singularities.

- Singularity 1: The U-axis is at an angle of 0° ±15°.
- Singularity 2: The U-axis is at an angle of 180° ±15°.
- Singularity 3: The rotation center of the B-axis (P-point) is near the vertical line of the S-axis (within 300 mm).
- Singularity 4: The B-axis is at an angle within the range of 0° or 180° ±15°

Fig. 5-1: Example of Singularities



Singularity 1	Singularity 2	Singularity 3	Singularity 4

To avoid singularities, the motion limits of various Robot axes are restricted to prevent it from entering singular positions. However, in rare instances, the Robot can get into a singular position. Under these conditions, the following actions should be taken:

- Reduce jogging speed and attempt to jog the Robot away from the singular position.
- Use single axis moves (Joint Jogging or Move Axis buttons) and reduced jogging speed to escape singularities.

If power and force limiting alarms occur repeatedly, the user should disable PFL by turning OFF all active “External Force Monitor” settings to jog the Robot away from its singular position. Once resolved, re-enable the servos and restore PFL to its previous settings.

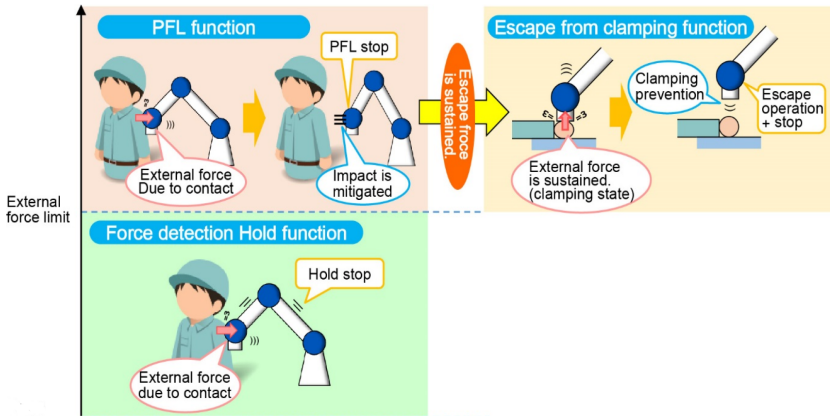
PFL Function

When enabled, the collaborative PFL (Power and Force Limiting) function will stop Robot motion according to measured external forces.

The PFL function monitors the external forces acting on the TCP and each axis of the robot. If the external forces exceed the preset limit, it performs a protective stop and puts the robot into the stop position monitoring state, i.e., the condition under which the robot is subject to stop position monitoring. This is shown in the figure below. Refer to *section 3.1.2 "Changing PFL Settings" on page 3-4* for instructions to configure the external force monitor value.

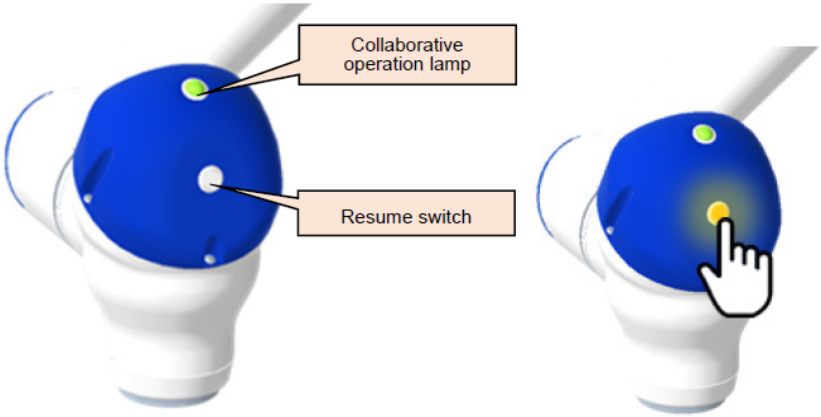
NOTICE

If an external force continually detects in the stop position monitoring state, the "Escape from Clamping" function (see details) may initiate robot motion in an attempt to safely reduce/eliminate the external force.



With collaborative operation enabled, the collaborative operation lamp, located on the cover between the T- and B-axes of the robot, lights up green. If the Robot is in the stop position monitoring state, the resume switch located below the collaborative operation lamp is illuminated.

Pressing the resume switch cancels the stop position monitoring and allows the operator to resume the operation from the protective stop position.



– Disabling PFL

YASKAWA recommends temporarily disabling PFL to perform certain operations to improve usability/performance.
Example scenarios include:

- Moving the robot at full speed
- Moving the robot near singular positions (see *Fig. 5-1*)
- When the robot cannot be operated due to an error caused by recurring external force monitor setting violations
- Automatic estimation of tool load

Follow the steps below to temporarily disable PFL for a collaborative system in its factory state (i.e. prior to user additions/edits).

DANGER

- Perform a thorough risk assessment before disabling PFL.

Not performing a thorough risk assessment will result in death or serious injury.

- Set safety distance per ISO 13855 when using a presence detection sensor.

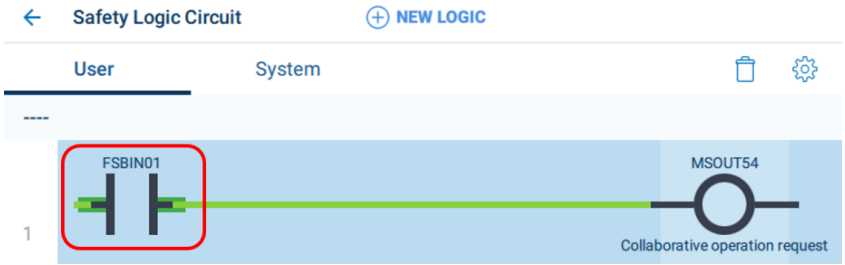
Not setting the safety distance per ISO 13855 will result in death or serious injury.

a) Change “Security Level” to Safety.
   - Refer to *section 3.1 on page 3-2*

b) Navigate to {Safety Settings} ⟶ {Safety Logic Circuit}

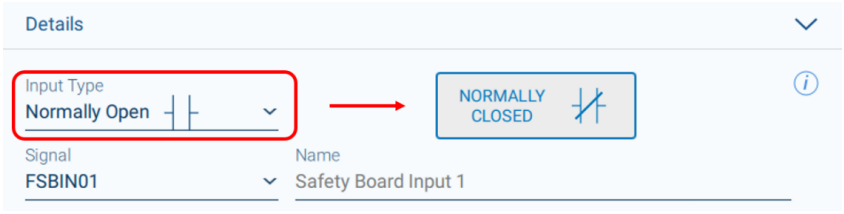
c) Find the line that contains an output (right side of screen) set to “MSOUT54 (Collaborative Operation Request”
   - First line at the top of the circuit for a system in its factory state

d) Select the left-most gate in this line
   - gate = FSBIN01 in the factory state



e) Select the input relay and reverse its Input Type

- i.e. change from Normally Open to Normally Closed in the Details panel to turn OFF the MSOUT54 request signal.



f) Perform {Readback} ⟶ {Write} process to save changes.

- MSOUT54 should now be OFF (see below), signifying that PFL is disabled. The green light on the robot's wrist should be OFF.

g) Perform *desired operation* with PFL disabled.

h) Restore PFL to its original state once the desired operation(s) are complete!

NOTICE

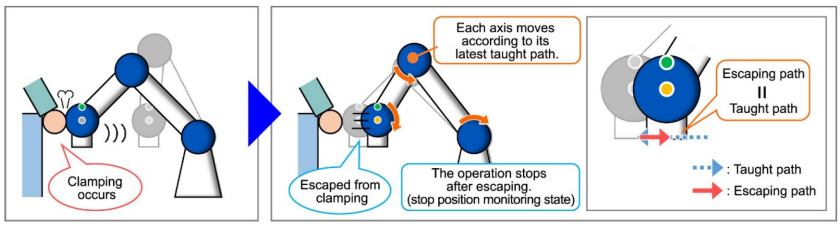
For HCxxDT robots with a Direct Teach hub, the Enable Switch is not required for jogging the robot. However, if a Smart Pendant notification appears stating “Press the Enable Switch to ...”, PFL has been disabled and should be re-enabled by reversing steps *e)* and *f)* to restore proper operation.

■ **Escape from Clamping Function**

When enabled, the PFL function described above starts the stop position monitoring in which the Robot is not operable if an object is clamped (stuck) between the robot and surrounding environment or between the joints of the robot. The escape from clamping function allows the robot to escape from such a state. If the PFL function performs a protective stop during collaborative operation and the robot detects a clamped state, the escape from clamping function performs the escape operation.

The escape operation moves in the direction of its previously taught path. During this process, the angular speed of each axis is limited to 5 [deg/s]. The escape operation finishes and the robot changes to the stop position monitoring state when the Robot achieves one of the following two conditions:

- The clamped state has successfully been removed OR
- Any axis moves by more than 3.0 [deg] during the escape operation



The user can neither disable the escape from clamping function nor change the escape operation. During the escape operation, the external force limit of the PFL function is temporarily set to the value larger than the current external force. After escaping from the clamping, the external force limit is reset to the original setting and the job goes into the suspended state. The user can resume the job from the suspended position by pressing the resume switch to cancel the stop position monitoring state and then pressing the [START] button on the Smart Pendant.

- For additional information on the Escape from Clamping function, refer to *chapter 2.5 Escape from Clamping Function of the YRC1000/ YRC1000micro Collaborative Operation Instructions.*

6 References

6.1 Manuals

List of manuals referenced throughout this Quick Start Guide or may be needed:

Global P/N	Americas P/N	Title
HW1484764	*181437-1CD*	*YRC1000/YRC1000micro Collaborative Operation Instructions*
HW1485083	*184672-1CD*	*MOTOMAN-HC10DT INSTRUCTIONS*
HW1486129	*190085-1CD*	*MOTOMAN-HC20DT INSTRUCTIONS*
RE-CTO-A222	*181274-1CD*	*YRC1000micro INSTRUCTIONS*
HW1485285	*184757-1CD*	*YRC1000micro SUPPLEMENTARY INSTRUCTIONS FOR Functional Safety Board*
HW1485509	*184775-1CD*	*YRC1000/YRC1000micro INSTRUCTIONS FOR Smart Pendant*
HW1484544	*183448-1CD*	*YRC1000micro OPTIONS INSTRUCTIONS FOR FUNCTIONAL SAFETY FUNCTION*
NA	*192685-1CD*	*YRC1000micro OPTION SUPPLEMENT FOR I/O CONFIGURATION FOR BREAKOUT BOARD*
NA	*192607-1*	*READ FIRST,SMART PENDANT ADAPTER SETTINGS,YRC1000micro*
NA	*190917-1*	*SMART SERIES ROBOT INCLUDED EQUIPMENT,HC10DT,YRC1000micro*
NA	*191731-1*	*HC20XP ROBOT INCLUDED EQUIPMENT*

6.2 Customer Support

If needing assistance with any aspect of the Smart Series HC10/HC20 Collaborative Robot, contact a local YASKAWA representative using the information on the back cover.

When calling, have the following information available:

- Primary Application
- Robot Controller software version
- Smart Pendant software version
- Robot Serial Number (Located on the robot data plate)
- Robot Sales Order Number (Located on the Robot Controller data plate)

NOTICE

Fig. 2-6 "Robot Controller and Smart Pendant Software Version" on page 2-4 shows the location of the Robot Controller and Smart Pendant software version information.

When using the website to contact a YASKAWA representative, provide a detailed description of the issue, along with complete contact information. Allow up to 36 hours for a response.

YASKAWA SMART SERIES
HC10/HC20 COLLABORATIVE ROBOT
QUICK START GUIDE

WITH SMART PENDANT AND YRC1000micro

For inquiries or after-sales service on this product, contact your local YASKAWA representative as shown below.

YASKAWA ELECTRIC CORPORATION
2-1 Kurosakishiroishi, Yahatanishi-ku, Kitakyushu, 806-0004, Japan
Phone: +81-93-645-7703 Fax: +81-93-645-7802
http://www.yaskawa.co.jp

YASKAWA AMERICA, INC. (MOTOMAN ROBOTICS DIVISION)
100 Automation Way, Miamisburg, OH 45342, U.S.A.
Phone: +1-937-847-6200 Fax: +1-937-847-6277
http://www.motoman.com

YASKAWA EUROPE GmbH (ROBOTICS DIVISION)
Yaskawastrasse 1, 85391, Allershausen, Germany
Phone: +49-8166-90-100 Fax: +49-8166-90-103
http://www.yaskawa.eu.com

YASKAWA NORDIC AB
Verkstadsgatan 2, Box 504, SE-385 25 Torsas, Sweden
Phone: +46-480-417-800 Fax: +46-486-414-10
http://www.yaskawa.se

YASKAWA ELECTRIC (CHINA) CO., LTD.
22F, One Corporate Avenue, No.222 Hubin Road, Huangpu District, Shanghai 200021, China
Phone: +86-21-5385-2200 Fax: +86-21-5385-3299
http://www.yaskawa.com.cn

YASKAWA SHOUGANG ROBOT CO., LTD.
No.7 Yongchang North Road, Beijing E&T Development Area, Beijing 100076, China
Phone: +86-10-6788-2858 Fax: +86-10-6788-2878
http://www.ysr-motoman.cn

YASKAWA ELECTRIC KOREA CORPORATION
35F, Three IFC, 10 Gukjegeumyung-ro, Yeongdeungpo-gu, Seoul, 07326, Korea
Phone: +82-2-784-7844 Fax: +82-2-784-8495
http://www.yaskawa.co.kr

YASKAWA ELECTRIC TAIWAN CORPORATION
12F, No.207, Sec. 3, Beishin Rd., Shindian District, New Taipei City 23143, Taiwan
Phone: +886-2-8913-1333 Fax: +886-2-8913-1513
http://www.yaskawa.com.tw

YASKAWA ASIA PACIFIC PTE. LTD.
30A Kallang Place, #06-01, 339213, Singapore
Phone: +65-6282-3003 Fax: +65-6289-3003
http://www.yaskawa.com.sg

YASKAWA ELECTRIC (THAILAND) CO., LTD.
59, 1st-5th Floor, Flourish Building, Soi Ratchadapisek 18, Ratchadapisek Road, Huaykwang, Bangkok 10310, Thailand
Phone: +66-2-017-0099 Fax: +66-2-017-0199
http://www.yaskawa.co.th

PT. YASKAWA ELECTRIC INDONESIA
Secure Building-Gedung B Lantai Dasar & Lantai 1 Jl. Raya Protokol Halim Perdanakusuma, Jakarta 13610, Indonesia
Phone: +62-21-2982-6470 Fax: +62-21-2982-6471
http://www.yaskawa.co.id

YASKAWA INDIA PRIVATE LIMITED (ROBOTICS DIVISION)
#426, Udyog Vihar Phase-IV, Gurgaon, Haryana 122016, India
Phone: +91-124-475-8500 Fax: +91-124-475-8542
http://www.yaskawaindia.in

YASKAWA

MANUAL NO.
188791-1◈