Help sheet 12

HELP! An error message!

Getting started

>START NOT DEFINED! ABORTED
Your keyswitch is in cold start position. If you already have a project in the controller simply turn the key to warm start and press reset. If you have not yet started programming then enter ROBOFORTH then turn the key to warm start. After you have programmed something enter USAVE to save your program to controller flash memory.
If your keyswitch is not in the cold start position then your program may be corrupted. In that case switch it to the cold start position, press reset then enter ROBOFORTH and turn back to warm start.

STOP BUTTON PRESSED but it wasn't. Check the jack in the rear of the controller.

>CALIBRATE
CANNOT FIND SENSOR
On R12 only e.g.1235 CANNOT FIND SENSOR
On R17 you just see CANNOT FIND SENSOR

If you enter
VIEW LIMITS
you will see the count (number of bits) for each axis from the home position to the sensor. CALIBRATE allows these counts and a bit more to find the sensor. If the count for an axis exceeds this number then you get an error. Usually this will only happen with the rotate axis because it is hard to know where the home position is for rotate. The rotate axis is axis 5 on a 5-axis robot and axis 6 on a 6-axis robot. It is usually sufficient to just enter CALIBRATE a second or third time so the rotate axis finally reaches the sensor.
R12 only
The numbers displayed on screen are the axis being calibrated. If you see
123 CANNOT FIND SENSOR
then it is axis 3 than can not calibrate. Assuming you set the robot up in home position then a fault is indicated.
123546 CANNOT FIND SENSOR
means axis 6 is the problem axis.
On a 5 or 6 axis system – especially on a 6 axis system – each time you enter CALIBRATE check that it has not rotated more than 360 degrees. Make a mark on the flange. If it will not calibrate within 360 degrees then a fault is indicated. The fault will most certainly be rectified by adjusting the sensor. See the R12 service manual on how to adjust the sensors.

>CALIBRATE
123546 CANNOT CLEAR SENSOR
This means sensor 6 is actually at the sensing position.
1235 CANNOT CLEAR SENSOR
This means sensor 5 is actually at the sensing position. This is the wrist axis in a 5-axis system.

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Repeating the CALIBRATE command can clear the problem but the time-out is shorter so it may take too many tries.

With the robot at home position enter
PP
you will see a row of 1s and 0s
11111110 is what you should see.
11101110 means axis 5 is sensing. Press escape to exit
If it's a 5-axis robot enter
TELL WRIST 1000 MOVE then enter
PP again
You should now see
11111110
If the sensor is still a zero then a fault is indicated. The sensor may need adjustment. See the r12 service manual for how to adjust sensors 5 and 4.

11011110 means axis 6 is sensing. Press escape to exit
Enter
TELL WRIST 1000 MOVE then enter
PP again
You should now see
11111110
If sensor 6 is still a zero then a fault is indicated. The sensor may need adjustment. See the r12 service manual for how to adjust sensor 6.

R17 only
R17 will only tell CANNOT FIND SENSOR and does not indicate which axis.
Enter DE-ENERGIZE and pose the robot at approx home position.
Enter PP. You should see
11111111
If any bit is 0 then that axis is sensing. Move that axis until you see zero. If you do not see zero then that axis sensor needs to be adjusted. For example
11111110 means waist sensor needs adjustment.
11111101 means shoulder
11111011 means elbow
etc. press escape to exit.

Go to ST Robotics home page, information, downloads and download the R17 service manual pdf.

`ENCODER-STEPPER MISMATCH AXES n n n`
Where n n n is a list of the axes which failed.
If all the axes have failed then maybe you didn't type START at the beginning, or the sensor cable is not properly plugged into the robot.

One or more axes could be a result of:
collision, obviously
running too fast – reduce the value of SPEED and ACCEL. If you lose track of what SPEED or ACCEL you have then try NORMAL or start afresh with START CALIBRATE
tolerances too tight – type WHERE and compare the top and bottom lines. The top line is the target position and the bottom line is where the encoders think the robot is.

If you are sure you typed START, are sure there was no collision or a stall due to too much payload or speed, then a fault is indicated. Note that the encoders are simply watchdogs, looking out for a collision or a stall. But the encoder itself could be the fault.

So as soon as you see the encoder error enter
`WHERE`
Does the top and bottom line differ badly on the offending axis?
`HOME` (you may get the error again)
`CALIBRATE`
this results in two lines of numbers. The first line shows the errors since the last time you calibrated. If any errors in that line are more than 10 then a fault is indicated. (note that after heating up from cold the first CALIBRATE may show errors up to 20). This means the encoder report is real and there is a real problem, for example a broken belt.

If there are no serious calibrate errors then the encoder itself is mis-reporting. Run the system again until you get the error then enter
`WHERE`
Compare the top and bottom lines.
If there is a difference of 8 or more for an R17 or more than 50 for an R12 it could be all you need is to increase the tolerances. The tolerance for each axis is in an array ENCTOLS as follows
`ENCTOLS` – the waist
`ENCTOLS 2+` – shoulder
`ENCTOLS 4 +` – elbow
`ENCTOLS 8 +` – hand and wrist

Suppose you had `ENCODER-STEPPER MISMATCH AXES 2`
This is the shoulder encoder complaining. Suppose you see that the difference between the top and bottom lines for the encoder is 12. This is acceptable. Enter
`ENCTOLS 2+ ?`
What is the value?
R17 Suppose it is 10. Then the actual error exceeds the tolerance. Increase the tolerance to, say, 20
`20 ENCTOLS 2+ !`
similarly for the other axes.

R12 Suppose it is 60. Then the actual error exceeds the tolerance. Increase the tolerance to, say, 80
80 ENCTOLS 2+ !
similarly for the other axes.

You can temporarily disable all the encoders so you can continue running until a more convenient time. Enter

0 EFP !
before using START

ENCODER-STEPPER MISMATCH AXES
And no axes given.
This means the error was fleeting and less than the tolerance by the time the report was given. Again enter WHERE and see if one axis is close to the tolerance.

CAN'T REACH
(error 5)
There can be a number of reasons

CAN'T REACH ON Z
There is a variable MINZ that has the value (usually) -3000 i.e. 300mm lower than the center of shoulder rotation (the origin). It is to protect against driving through the bench.
You can see its current value with
MINZ ?
To change it, say to -5000
-5000 MINZ !
This is not permanent and must be entered after every START

CAN'T REACH ON Y
The variable MINY is usually -5000 i.e. 500mm behind the robot to protect against hitting a rear wall. You can change that with e.g.
-7500 MINY !

CAN'T REACH OUT
You are simply trying to reach further than the length of the arm: 500mm for an R12 and 750mm for an R17

CAN'T REACH IN
You are trying to reach in too far in danger of colliding with the central collumn. This is a variable MINLEN which usually has a value 1750 (175mm from the waist center of rotation).

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On loading a project or reloading the ed2 text using the red down-arrow:

>| >>>>>>>XXXX NOT DEFINED! ABORTED
and a dialog box that says >expected with an OK button.
(where XXXX is just an example)
Click the OK box and you see
>IOFLAG C0SET
>

This is because a word you have used in your text file was not defined already. Perhaps it is mis-spelled. Try to find the word in your text file and correct it.

If the word that is undefined is a word after a colon, for example : NEWPART but you get
NEWPART UNDEFINED! ABORT
then the most likely reason is a missing semi-colon from your previous definition. The system is still in compile mode when it got to your new word. For example:
: SETUP
words
words
missing semi-colon
: NEWPART
etc

To help find these problems you can go to RobWin **settings, configuration** and **un-check hide mode**. Then when you download your text you will see every word instead of the >>>>.

>| >>>>>>>> ABORTED
>
but no reason given. also a dialog box that says >expected with an OK button.
The most probable reason is a stack underflow resulting from an improper use of loop words, or a missing loop word, for example UNTIL with no BEGIN.
You can see better where the error occurs like this: go to settings, configuration and un-check hide mode. Now load the file again. If the error comes right after a word like UNTIL or LOOP or THEN then that is the reason – missing BEGIN or missing DO or missing IF.

Using RUN or any word that contains RUN you get
ILLEGAL! ABORTED
or
STACK UNDERFLOW! ABORTED
You must select a route first. Either type its name now or make sure the name of the route is in your code.

Too tight line x ABORTED

This error only occurs in CONTINUOUS mode. See the RoboForth manual, section 7.2.6. If two lines are right close to each other in coordinate values the DSP can not change the direction in the time allowed at the SPEED and ACCEL values given. Simply reduce SPEED or increase ACCEL and try again. There is a word ADJUST which reduces speed

automatically to a value that works. The word SMOOTH both invokes CONTINUOUS mode and finds a suitable maximum speed.

If you have a SPEED value embedded in the route as a function then SMOOTH and ADJUST will not work. It will hang and you need to press escape to get out. Your only recourse is to edit the speed values in the route or increase the value of ACCEL.

Another recourse is to list the route and see if two lines are very close to each other in values and maybe edit those two positions further apart.

You might possibly by mistake have two lines next to each other one being a duplicate of the other. This can never work. Delete one of them.

For other errors type `WWW` (what went wrong). This reports an error number that you can look up at the end of this sheet and in the RoboForth manual

Run file too short

When loading a project you get this message. This is the reason why: when you shut down RobWin and there is an unsaved data it tries one last communication with the controller. If the controller is switched off it can save the run file back with length zero.

What to do *(advanced procedure)*: If you did a USAVE before you switched off the controller then the good news is the data is in the controller and can be recovered. Refer to help sheet 29 for detailed instructions.

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Enter WWW (What Went Wrong)

ERR value **Error/Probable cause**

1 Bad value e.g. impractical value entered for some critical variable.

2 Encoder mismatch e.g. robot stalled by obstruction or too high speed/acceleration

3 Stop button pressed

4 Interrupted - Interrupt connected and ENABLEd but INTVEC not SET

5 Can't Reach (co-ordinates out of bounds)
Position further than maximum reach of robot (e.g. 550mm for an R19, 750mm for an R17, 500mm for an R12)
This is a non fatal error when using the teach pad or Bluetooth teach pad.

6 Cartesian position not valid
Some move in joint mode was made since the last Cartesian move so that the Cartesian variables are out of date.

7 Non positional data in ADD

8 Invalid position in ADD, GOTO or LISTROUTE

9 ADDing joint and Cartesian positions together

10 ADDing two absolute positions

11 Invalid line number

12 Incorrect header using OLD (name doesn't match data)

13 Route full

14 RUN aborted

15 Object lost - UNGRIP used while holding object

16 Can't find sensor (sensor target not reached)
Usual reason is the distance to the sensor is too great and the system has timed out. This is common with the last (roll) axis which can be up to 360 degrees away from the sensor. Just repeat the command until it completes.

17 Can't clear sensor (behaving as if still on the sensor target)
Perhaps faulty sensor, or robot stalled or excess backlash. Try repeating the command.

18 Stalled in TEACH mode (see error 2).

19 No room for any more data (data memory full).

20 Tried to move with brake engaged.

21 Position already occupied; has something in it. (usually error in PUT)

22 Continuous path algorithm error.

23 ADJUST error (also SMOOTH) – hung in a loop requiring escape to exit.

24 Invalid code in continuous path.

25 Didn't type START
or: PC port was reprogrammed or rewritten in such a way as to disable the soft stop.

26 No object there (error in GET).

27 Can not use RELATIVE and CARTESIAN modes together.
V16: Can not use SUB or RELATIVE routes at all in V16.

28 START-HERE and END-THERE only work in Cartesian mode.

29 Invalid command in curve construction.

30 CALCHECK (CALIBRATE) error exceeds tolerance. V12 up.

31 CHASE segment too large.

32 Bad angle value for TOOL motion demanded. (non fatal error)

33 ADJUST error (also SMOOTH) – route has 2 or more identical adjacent lines (rejected by DSP).

Errors 14, 15, 18, 32 are non-fatal i.e. do not abort robot program i.e. only show warnings
Errors 2, 3, 4 may be re-programmed.