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Chapter 6 Settings and Start up

Guides you through set up and test run. Perform the setup and start the system by following the instructions given in items 6-1 through 6-5.

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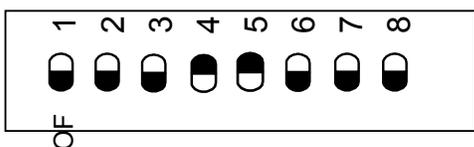
6-1 Setting up the system

The items described below must be set in order for the system to operate properly. The system will operate as set at the factory. However, change the settings as required for each installation.

Setting the DIP switch

Before turning the power on, open the front cover in the main unit and check the Dip-switch setting. Change the setting as required. (Refer to Fig. 1)

Set the DIP switch (SW2) on the main board to set the following items:



(Note) 1... DSW-1

(1) Selecting the type of monitoring

DSW-1	DSW-2	DSW-5
OFF	OFF	ON

DSW-1, -2 and -5 need no changes, as they have been set at the factory. Simply verify the settings shown in the table above.

If the settings are correct, a “HARDNESS MONITOR” message is displayed when the power is turned on.

If the settings are incorrect, a “DIP SW Err” message will be indicated when the power is turned on or when initializing at a reset.

(2) Setting for M-alkaline value

DSW-3	DSW-4	M-alkaline value	Remarks
OFF	OFF	Under 60 mg/L	
ON	OFF	60 mg/L and over, but under 120 mg/L	
OFF	ON	120 mg/L and over, but under 300 mg/L	Factory setting
ON	ON	300 mg/L and over, but under 500 mg/L	

CAUTION

Change the DSW-3 and DSW-4 settings according to the M-alkaline value of the raw water. Note that an evaluation error may result from a setting that is incompatible with the M-alkaline value of the sample water.

Do not change the settings other than DSW-3 and DSW-4, or the system may malfunction.

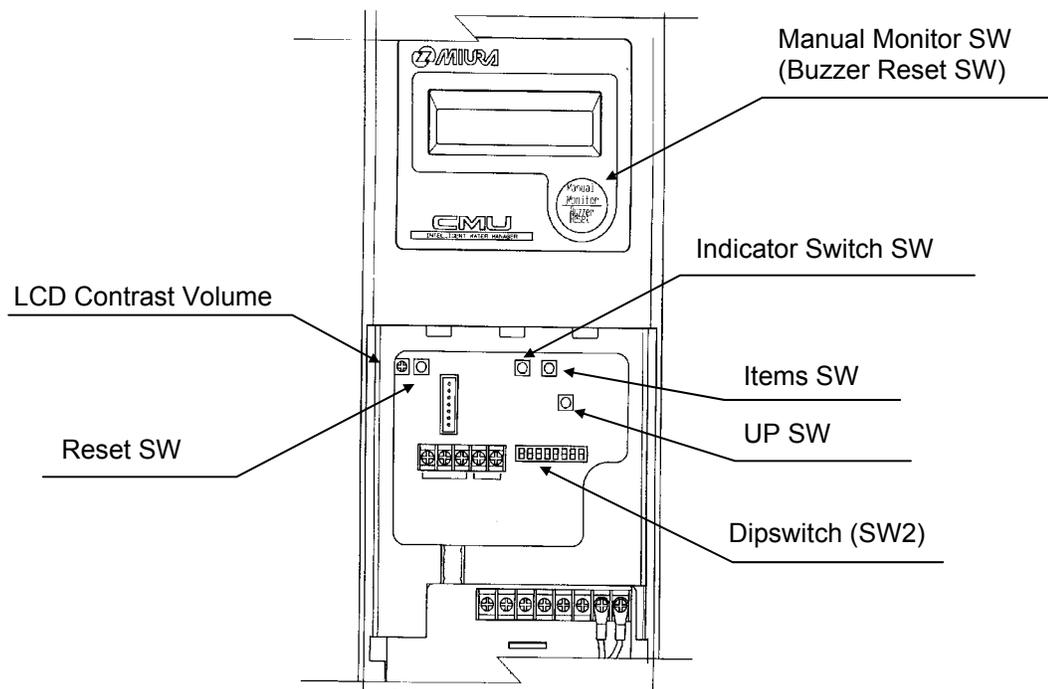


Fig. 1

Main switches used for setting and start up of the system

6-2 Checking the system operation and settings

WARNING

Be sure to check the following before turning on the power:

- [1] The power-supply voltage is correct. (24 V or 110 V transformer to 24 V)
- [2] The wiring and piping are correct.
- [3] The reagent cartridge is properly installed.
- [4] The system's water pressure is on and ready to feed water.

6-2-1 Turning the power on

Turn on the power. Some units have the data-memory backup battery already charged, while others do not. Check the system accordingly.

- (1) If the data-memory backup battery has been charged by the time the power is turned on, or when reinitialized from a reset:
 - [1] Check to verify that a "CPUver..." message is displayed when the power is first turned on.
 - [2] Next, verify that a "MHardness Mon" message is displayed.
 - [3] The system then enters the status-verification test mode.

- (2) If the data-memory backup battery has not been charged when the power is turned on, or when reinitialized after executing a complete reset.
 - [1] Check to see that a "CPUver..." message is displayed when the power is first turned on.
 - [2] Verify that an "All Clear" message is displayed.
 - [3] The mode changes to Setting mode.
Refer to Section 6-3, "About items to be set in Setting mode," on page 60 to set the items. Be sure to set the current date, time and cartridge-installation date.
 - [4] When all settings have been made, press the Indicator switch.
 - [5] Verify that a "MHardness Mon" message is displayed.

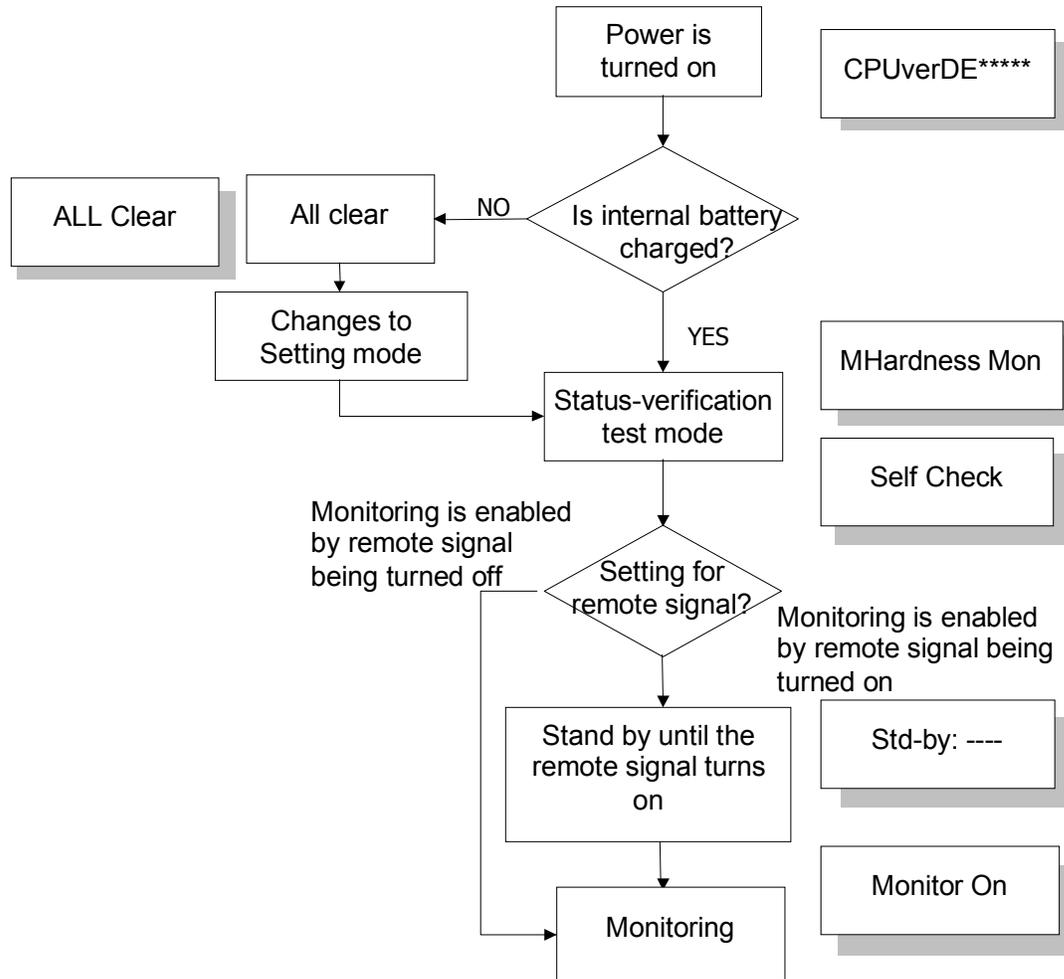
 - [6] The mode automatically changes to the status-verification test mode to verify correct system operation.

- (3) If the LCD display is hard to read, adjust it with the "Contrast Adjust" potentiometer.

CAUTION

If the battery has been charged, be sure to review and set all items described in "Setting mode" on page 60 after exiting the status-verification test mode.

Flowchart for Colormetry operational processes when turning on the power



6-2-2 Status-verification test mode

This is the mode that automatically tests the system for proper operation.

- If the system is working correctly, the status verification is complete in about two minutes. At its completion the buzzer sounds and monitoring starts.

Note: If the remote signal setting is for “Monitoring is enabled by remote signal being turned on,” the system will stand by for monitoring as of the completion of the status verification until the remote signal turns on.

- If a normal condition is not verified, the status verification (self-check) is repeated. The status verification will be repeated up to five times until the system checks out as normal. Repetition will require some time. Wait until the final results are displayed.
- During a repeated self-check, a “Self-Check Retry” indication is added to the displayed status message.
- If repeated retries fail to verify normal conditions, the buzzer will sound and an error message will be indicated in the LCD display. The self-check stops and the system will then enter system error standby (self-diagnostic error) mode.

NOTE

If the “Wash Cfm F” or “Wash F” alarm occurs during a test run or initial feeding after replacing the fiber filter – (even though the main feed-water valve is open and pressure is provided) -- take the action shown below. This is an initial phenomenon caused by bubbles in the filter casing. It is not a system problem.

The buzzer sounds on the alarm. Press the Manual Monitor switch to stop the buzzer, then press the switch again to force monitoring (that is, to feed the system). If the alarm recurs, repeat this process.

If a couple of repetitions will not stop the recurrence of an alarm, try monitoring with the constant-flow regulator valve (black rubber plate) removed. If the removal eliminates the alarm, restore the constant-flow regulator washer and perform another monitoring to verify that no alarm recurs.

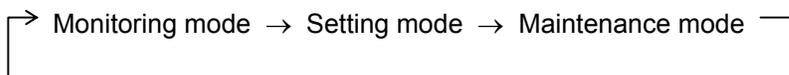
If the fiber filter cartridge is replaced while the power is on, the system would not automatically enter the status-verification test mode. Press the Manual Monitor switch to monitor (to feed the water) to verify that no alarm occurs. If the alarm recurs, repeat the process.

6-3 About items to be set in Setting mode

These items set up the Colormetry system for operation. Be sure to follow these procedures to set them, since they are also important in understanding monitoring and administering cartridge replacement.

How to enter and exit the Setting mode

Each press of the indicator switch changes the modes as follows:
(Refer to Fig. 1 for the switch location.)



- To enter Setting mode: Press the indicator switch to switch mode.
- To exit from Setting mode: Press the indicator switch to exit the setting mode.

The mode will automatically return to the monitoring mode if no switch is pressed for 10 minutes.

How to input item settings

- [1] In the Setting mode, press the Item switch as required to select an item to be set.
- [2] Press the Up switch to vary the setting.
(To vary a setting over a wide range, hold the Up switch for over a second to start varying the indication at a faster rate.)
- [3] To make the changed valve valid, switch the screen in which the change/setting is made to another screen by pressing the "Item" or "Indicator" switch.

Item	Sample indication	Setting range	Setting increment	Factory setting	Remark
Current date	SDate 06/23/99	97/01/01 ~ 20/12/31	1		Note 1
Current time	STime 15:28	00:00 ~ 23:59	1		Note 1
Monitor interval	SIntvl 060min	000 min ~ 180 min	30 min	060 min	Note 2
Monitor start time	SStart 08:30	00:00 ~ 23:59, 24:--	1	24:--	Note 3
Monitor stop time	SStop 20:30	00:00 ~ 23:59	1	Stop	Note 3
Remote signal function	SRet Sgl Off	Monitor by remote signal on Monitor by remote signal off		Monitoring is enabled by remote signal being turned off	Note 4
Remote signal delay	SRet Sgl DI 10s	0 sec ~ 30 sec	1 sec	0 sec	Note 5
Alarm set point	SAlarm Set 2.0mg/L	1 mg/L, 2 mg/L	1 mg/L	2 mg/L	Note 6
Abnormal condition	SAlarm Inc No:2	1 to 3 time	1	2 times	Note 7
Response (alarm) cycle	SAlarm Det No:2	1 to 3 times	1	2 times	Note 8
Reagent cartridge installation date	SC Rpl 06/23/99	97/01/1 ~ 20/12/31			Note 9

Note 1. Current date and time: Set these without fail.

Note 2. Monitor interval:

This sets the interval at which monitoring will be performed. It is set at 60 minutes at the factory, so no change is required except for special circumstances. Be aware that if a 000 min is set, monitoring will be performed continuously.

Note 3. Monitor start and stop times:

These determine the start and end times of the monitoring period.

The factory settings are for continuous 24-hour monitor, "24: --." Switching the items will not display the stop time, which is not applicable to continuous 24-hour monitor.

In setting the times to suit the installation, if the start and stop times are set to the same time, continuous 24-hour monitor will take effect.

Note 4. Remote signal functions:

The Colormetry system may be set to monitor or stand by for an external remote signal. Make settings according to the requirements at the installation.

[1] Monitor is enabled by remote signal being turned off state (a factory setting)

Under this setting, monitoring is performed if the remote signal is being turned off at the time the monitor interval has elapsed. For instance, monitoring can be inhibited while the water softener is regenerating, if a remote regeneration signal from water softener is input.

[2] Monitoring is enabled by remote signal being turned on

Monitoring is performed if the remote signal is on at the moment the monitor interval has elapsed. For instance, monitoring for hardness leakage may be performed only while water is being fed, if a feed water-control signal is input.

NOTE

[1] If no remote signal is connected for operation, set the system up for monitoring is enabled by remote signal being turned "off" state.

[2] If a "now feeding water" signal is available from the site, connect the signal and set up the Colormetry system to prevent evaluation and operational errors.

Note 5. Remote signal delay time:

This sets the number of seconds for which monitoring is to be delayed after receiving the remote signal at Colormetry system. Set it as required. The factory setting is zero.

Note 6. Alarm set point:

The system allows setting up a specific concentration at which to issue the Abnormal-condition alarm. The setting may be either 1 mg/L or 2 mg/L. The factory setting is 2 mg/L.

Note 7. Abnormal-condition retry:

If a evaluation is higher than the alarm set point (Note 6 above), monitoring is repeated the number of times set by this item to reverify the result.

- [1] If all repeated monitoring is higher than the alarm set point, that particular monitoring session is determined to be abnormal.
(The actual abnormal-condition alarm is issued only if the condition set in response (alarm) cycle is satisfied.)
- [2] If a repeated monitoring is below the alarm set point, the monitoring session is determined to be normal and is closed.

Note 8. Response (alarm) cycle:

If an abnormality, as determined in the procedure described in abnormal-condition retry (Note 7 above) continuously repeats the number of times set in this item, an abnormal-condition alarm will be issued.

For detailed descriptions of items in notes 4 and 5, refer to page 24 under "Method and examples of utilizing remote signals."

The relationship between the items in notes 2, 7 and 8 and the issuance of the abnormal-condition alarm is also explained (with illustration) in Section 4-5, "Evaluation method." Set this item after carefully reviewing the evaluation method.

Note 9. Reagent cartridge installation date:

The item updates the installation date of the reagent cartridge. Each alternate press of the Up switch alternatively indicates the cartridge installation date or the current date. Normally, the installation (replacement) of the cartridge with the power turned on will automatically update the installation date, so there is no need to set this item.

If a cartridge is installed with the power turned off, such as during a test run, subsequent restoration of the power will not automatically update the installation date. If the date must be updated, press the Up switch to update it.

NOTE

Note that if the Up switch is used to switch the display from the installation date to the current date, and then either the Item or Indicator switch is pressed to confirm (update) the setting, the old date (before updating) will no longer be available.

6-4 Verifying monitor operation

Verify whether monitoring is being performed properly after all items have been set.

Checking the monitor operation (1)

A "Monitor On" message is indicated in the display during monitor operation, regardless of whether it is an automatic or manual session. When the monitoring is complete, a "Result: ****" message is indicated. Two minutes after monitoring, the message changes to "Std-by:*****."

First, verify that the system is under pressure and ready to feed water. Check for correct monitor operation by pressing the Manual Monitor switch to initiate the monitoring process.

If an error occurs during the monitoring process, the system will assume the system error standby (self-diagnostic error mode).

Checking the monitor operation (2)

Verify that monitoring is being performed properly at the monitor interval or controlled correctly via the remote signal. To do so, use the following procedure:

- [1] Verify that the system is under pressure and ready to feed water.
- [2] Set the monitor interval at 000 min. in Setting mode.
This setting allows continuous monitoring between the monitor start and stop times as set in Setting mode.
Set the monitor start and stop times as desired.
- [3] If no remote signal is connected, verify that the system will continuously perform monitoring between the monitor start and stop times.
If a remote signal is connected, check to see that monitoring is performed on the remote signal being turned on or off during the period between monitor start and stop times.
- [4] After checking monitor operation, restore the monitor interval and monitor start and stop times to their original settings.

6-5 Verifying the issuance of an abnormal-condition alarm

Deliberately create an abnormal condition and verify the sounding of the buzzer operation or the closure of the external alarm's master contact output. Use the following procedure for verification:

- [1] Turn the no.1 switch (DSW-1) in the DIP switch to "On."
Refer to "Setting the DIP switch" on page 55.
- [2] Press the Reset switch to reinitialize the system.
Refer to Section 9-4, "How to reset," on page 97.
- [3] Verify that a "DIP SW Err" message is indicated in the LCD display, the buzzer sounds and the external alarm's master contact closes.
- [4] After so verifying, return the no. 1 switch (DSW-1) to the "Off" position and press the Reset switch to reinitialize the system.
- [5] Since an abnormality has been caused deliberately, an error will be recorded in the system's error record. (Refer to Section 9-3, "Verifying error records (How to use Maintenance mode)," on page 93.)
If such a test record is undesirable, it may be deleted through the All Reset procedure (refer to Section 9-4, "How to reset," on page 97). This procedure, however, will delete all new settings and restore the factory settings. Select new settings again in Setting mode.

Chapter 7 Digital display description

Explains the messages displayed in all three modes.

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7-3	Maintenance Mode.....	68

7-1 Monitoring Mode

	Display	Description
1	CPUverDE111012	CPU version
2	Hardness Monitor	Hardness monitor
3	Pump Start Cfm	During verification of the pump in its home position
4	Self Check	Self check
5	Self Check Retry	Self check retry
6	Std-by: ----	Waiting for monitoring stage
7	Std-by: 0-1mg/L	Monitor stand-by: 1mg/L or less
8	Std-by: 1-2mg/L	Monitor stand-by: Between 1mg/L and 2mg/L
9	Std-by: >2mg/L	Monitor stand-by: 2mg/L or more
10	Monitor On	Monitoring ionic concentration(hardness)
11	Monitor On Retry	Monitor on retry
12	Result: 0-1mg/L	Result: 1mg/L or less
	Std-by: 0-1mg/L	Monitor stand-by: 1mg/L or less
13	Result: 1-2mg/L	Result: Between 1mg/L and 2mg/L
	Std-by: 1-2mg/L	Monitor stand-by: Between 1mg/L and 2mg/L
14	Result: >2mg/L	Result: 2mg/L or more
	Std-by: >2mg/L	Monitor stand-by: 2mg/L or more
15	Warning: >1mg/L	Hardness leakage detected: 1mg/L or more
16	Warning: >2mg/L	Hardness leakage detected: 2mg/L or more
17	Cartridge OFF	Cartridge disconnected
18	Cartridge OFF F	Cartridge disconnected fault
19	Pump Cfm F	Pump confirmation error
20	Pump F	Reagent injection pump fault
21	Wash F	Insufficient pre-wash
22	Wash Cfm F	Faulty confirmation on pre-wash
23	Injection Cfm F	Faulty confirmation on reagent injection
24	Injection F	Incomplete reagent injection
25	Wash Flow F	Insufficient water flow for wash
26	Photo Rpt F	Photoreceptor fault
27	SW ON Cfm	Switch ON confirmed after cartridge replacement
28	Dip SW Err	Dip switch error
29	New Cartridge	Need cartridge replacement

7-2 Set Mode

	Display	Description
1	SDate 06/23/99	S Date (m/d/y) 06/23/99
2	STime 15:28	S Time 15:28
3	SIntvl 060min	S Monitor interval 60 min
4	SStart 08:30	S Start time 08:30
5	SStop 20:30	S Finish time 20:30
6	SRet Sgl Off	S Monitor by remote signal off
7	SRet Sgl On	S Monitor by remote signal on
8	SRet Sgl DI 10s	S Remote signal time delay
9	SAlarm Set2.0mg/L	S Alarm set at 2mg/L
10	SAlarm Inc No:2	S 2 consecutive incidents set alarm off
	SAlarm Inc No:3	S 3 consecutive incidents set alarm off
11	SAlarm Det No:3	S 2nd leakage detection set alarm off
12	SC Rpl 06/23/99	S Cartridge replacement date(m/d/y)

S: Indicate Set Mode

7-3 Maintenance Mode

	Display	Description
1	MHardness 2.0mg/L	M Result hardness 2.0mg/L
2	MCPUver DE111012	M CPU version
3	M06/23/99 15:28	M Date(m/d/y) & time
4	MHardness Mon	M Hardness monitor
5	MIN-OUT Mode *	M Input-output mode
6	MOUT1 1111 1111	M Output1 1111 1111
7	MOUT2 1111 1111	M Output2 1111 1111
8	MIN1 1111 1111	M Input1 1111 1111
9	MIN2 1111 1111	M Input2 1111 1111
10	MAD FF FF <FIG---	M AD FF FF FF
11	MAD (Thmsta): FF	M AD Thermista: FF FF
12	MAD(R): FF <FIG---	M AD(R): FF FF
13	MAD(-): 00 00	M AD(-): 00 00
14	MAD(G): FF <FIG---	M AD(G): FF FF
15	MWash Pd 9.99S	M Pre Wash period 9.99 secoud
16	MMAikal < 60mg/L	M Set M-alkalinity at 60mg/L or less
	MMAikal < 120mg/L	M Set M-alkalinity at 60mg/L to 120mg/L
	MMAikal < 300mg/L	M Set M-alkalinity at 120mg/L to 300mg/L
	MMAikal <500mg/L	M Set M-alkalinity at 300mg/L to 500mg/L
17	MWL: <TBL---	M select from LED wavelength table: L
	MWL: S	M select from LED wavelength table: S
18	MOp Stus: <FIG---	M Operation status: FF
19	MAlarm Content *	M Alarm description
20	MError1: 11111111	M Error table 1: 11111111
21	Merror2: 11111111	M Error table 2: 11111111
22	MCartridge Dta *	M Cartridge data
23	MC Exc 06/23/99	M Cartridge replacement data(m/d/y)
24	MC Hrs 999999	M Cartridge used hours since replacement: 999999
25	MRgt Inj Fqc9999	M Reagent injection frequency since cartridge replacement: 9999
26	MLeakage Log1 *	M Hardness leakage record 1
27	MDate 06/23/99	M Date of Hardness leakage(m/d/y) 06/23/99
28	MTime 15:28	M Time of Hardness leakage 15:28
29	MEvl Stg Conc: 2	M Evaluation standard at concentration of 2
30	MLeakage Min9999	M Total leakage minute: 9999min.
31	MRset 06/23/99	M Date of reset (m/d/y): 06/23/99
32	MRset Time 15:28	M Time of reset: 15:28
33	MStm Fault Log1*	M System error record 1
34	MBlk Out Log1 *	M black out record 1

M: Indicate Maintenance Mode

Maintenance Mode display can be changed by pressing the “Items” switch.
In the event a * mark appears, mode/display can be changed by pressing the “UP” switch.

Chapter 8 Maintenance

Explains daily maintenance the Colormetry system and how to replace the reagent cartridge, fiber filter cartridge and constant-flow regulator valve.

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8-1 Routine care

(1) Daily inspection items

[1] Verifying the results of monitoring (weekly)

Use an ordinary hardness-indicator reagent to check for evaluation errors due to a possible system malfunction. Record the results.

An ordinary hardness-indicator reagent may be too low in sensitivity to compare the monitoring of minute hardness leakage against the Colormetry system. If the monitoring results of the two are obviously different, the system may have developed a problem.

Note: Use a low-range hardness indicator for this comparison (gpg range is not suitable).

[2] Verifying the results of automatic monitoring (weekly)

Check for proper automatic monitoring.

Where a remote signal is connected, but does not turn on due to a problem, the system will not enter the monitor status.

[3] Checking the state of feed water and drain pipes (as needed)

Check to see if the pipe is free of bends.

Bent pipe will prevent the adequate feeding of water. A bent drain tube will create back pressure, and in the worst case may cause water leakage.

[4] Replacing the reagent cartridge (every three to four months)

(Refer to Section 8-3, "Replacing the reagent cartridge," on page 73.)

Replace the cartridge when a "New Cartridge" message appears in the display.

[5] Replacing the fiber filter cartridge and constant-flow regulator valve (as needed)

Refer to Section 8-4, "Replacing fiber filter cartridge and constant-flow regulator valve," on page 77.)

(2) About verifying the amount of hardness leakage on the occurrence of hardness-leakage alarm (as needed)

The alarm trigger levels of hardness leakage are as low as 1 mg/L and 2 mg/L for the Colormetry system. These levels may be too low to be compared against the results of an ordinary hardness-indicator reagent evaluation method.

To verify the amount of hardness leakage, perform an analysis of water on Ca, Mg, Zn and Cu.

In comparison between the Colormetry system evaluation and water analysis, the results of the two may differ if the time and location of sample collection are different. For water analysis, obtain a sample from the Colormetry system's drain, as well, for comparison against the system evaluation result.

Recommended periodic maintenance schedule.

No.	Item	1 week	3 ~ 4 weeks	As Needed
[1]	Verifying the results of monitoring	●		
[2]	Verifying the automatic monitor operation	●		
[3]	Checking the state of feed-water and drain-pipes			●
[4]	Replacing the reagent cartridge		●	
[5]	Replacing the fiber filter cartridge and constant-flow regulator valve			●
[6]	Verifying the level of hardness leakage on the occurrence of hardness-leakage alarm			●

(3) About the prevention of freezing

If there is a risk of freezing in an installation in a cold region, but no protection against freezing has been applied to it, close the main feed-water line valve to the Colormetry system and drain the water at the supply end. (Drain the filter casing also, and remove and store the fiber filter cartridge in a nonfreezing area. Freezing may damage the fiber.)

If possible, drain the water from the monitor cell. If it is too difficult to do so, pull the cartridge lever and remove the reagent cartridge from the main unit.

 **CAUTION**

Freezing may crack the fiber filter cartridge, filter casing or monitor container inside the main unit.

8-2 General information

CAUTION

The maximum pressure of raw water to the Colormetry system is 71 psi. Pressure beyond that may cause water leakage due to deformations in the internal connections or gaskets. Be sure to use it under the specified pressure.

The drain end must open into the air. Back pressure at the drain end may cause an internal water leakage.

The main unit has a relief hole in the bottom to quickly drain away internally leaked water and prevent short circuits.

Do not place any object underneath the installed system that may get wet in the unlikely event of internal leakage.

Be sure to keep the feed-water and drain-water pipes free of kinks.

WARNING

- (1) Do not remove the front cover from the main unit.
- (2) Do not disassemble the Colormetry unit.

8-3 Replacing the reagent cartridge

Replace the cartridge in accordance with the procedure given below so that the system will provide a long service life.

(1) How Colormetry determines it is time for a new cartridge

The Colormetry system will determine that it is due for a new reagent cartridge when 3,500 hours have elapsed or after the reagent pump has operated 3,500 times following the installation of a new cartridge.

(2) What Colormetry will do at that time

It will display a [New Cartridge] message and issue an alarm. Even if Buzzer Reset is pressed to stop the buzzer, the buzzer will sound again after a week until the timer counter for the reagent cartridge is reset. The external alarm's master output contact will remain on, likewise. If no spare cartridge is available, obtain and reload one immediately.

If a "Reagent injection confirmation error" [Injection Cfm F] or "Reagent injection error" [Injection F] is displayed, press the reagent bag with a finger through the hole in the back of the cartridge to check for the remaining reagent. If none is felt in the bag, replace the cartridge immediately.

•How to replace the old cartridge

Replace the old cartridge according to the flowchart on the next page.

The power must be left on during replacement work. Start working in the Standby for Measurement mode. The timer counter for cartridge replacement will automatically be reset.

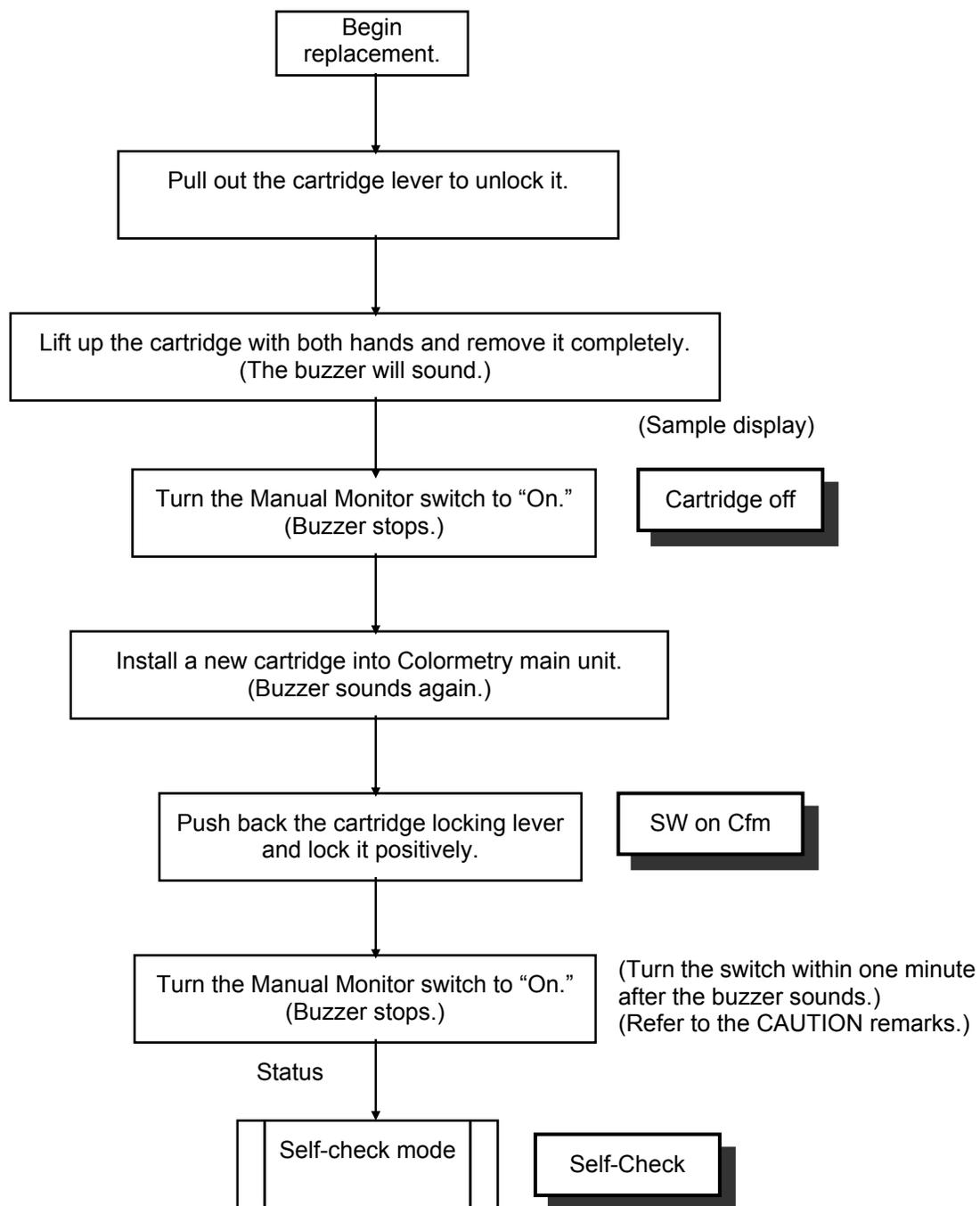
If a reagent cartridge is replaced (or installed) with the power shut off, the timer counter for cartridge replacement will not be reset automatically. In such a case, you must without fail manually enter the date the reagent cartridge was replaced. Refer to the section entitled, "About items to be set in Setting mode" on page 62 for instructions.

CAUTION

- Replace the cartridge with the power left on but only while the system is in monitor standby mode.
- Never remove the check tube attached to the nozzle of the reagent cartridge (refer to Section 3-2-2, "External appearance of reagent cartridge," on page 18.) Keep the fingers off the check tube too, since doing so may affect the amount of injection.
- When installing a new cartridge, push it down slowly, being careful not to let the nozzle and check tube hit main unit.

WARNING

Be sure to dispose of the used reagent cartridge only after completely discarding the remaining reagent from the reagent cartridge.



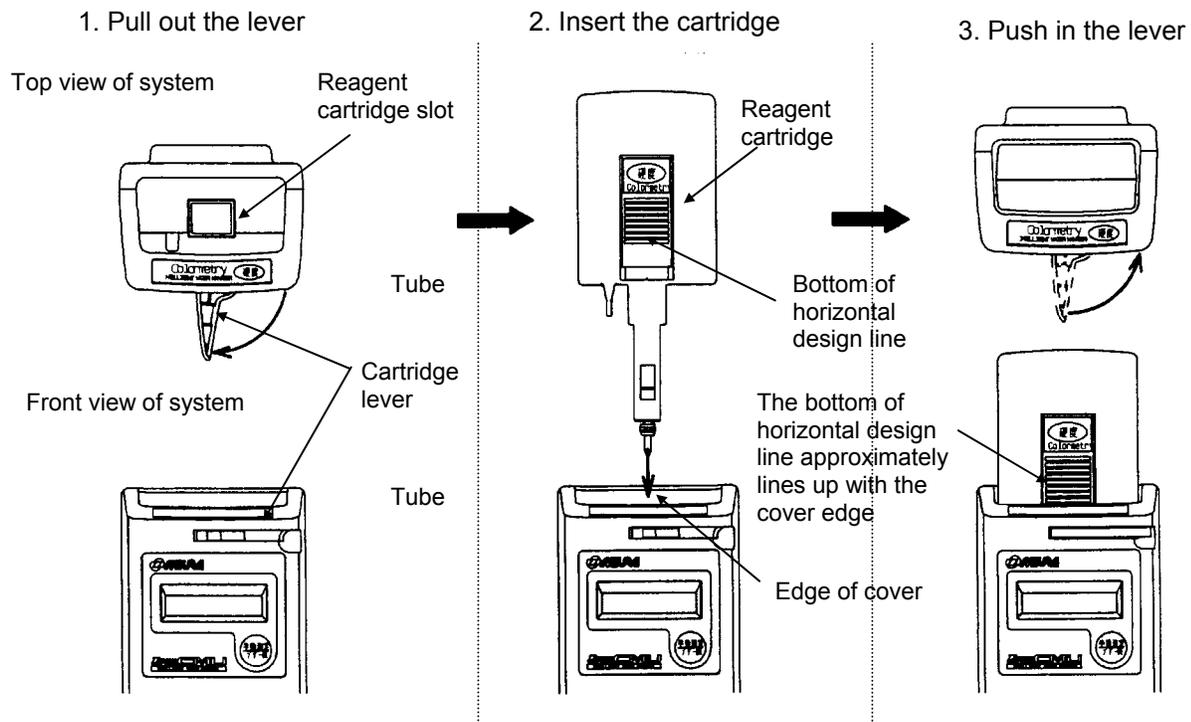


Fig. 15

⚠ CAUTION

If the reagent cartridge being used is temporarily removed for reinstallation later, do not press the Manual Monitor switch. The buzzer will stop automatically within one minute. Pressing the Manual Monitor switch will reset the timer for cartridge replacement, thereby rendering the automatically displayed replacement date meaningless.

 **CAUTION**

About the reagent cartridge

- [1] The reagent cartridge has a definite life. Finish a cartridge within one year of its date of manufacture, that is stated on the cartridge box. (A cartridge is used up in about four months.)
- [2] Do not store cartridges for a long period of time. If they are to be stored, select a cool, dark place.
- [3] Do not break the seal on the reagent cartridge bag until the moment of installation. Doing so will accelerate its deterioration.
- [4] Do not touch the nozzle or tube of the reagent cartridge. Doing so will affect the injection level, and in the worst case may stop monitoring.
- [5] Do not use the reagent cartridge for other than the Colormetry system.
- [6] Never disassemble a reagent cartridge. Reagent may splatter onto the skin or in the eyes.
- [7] Dispose of the reagent cartridge, assembled intact, as plastic waste.
- [8] If the reagent gets on the skin or in the eyes, immediately rinse it off with water.

8-4 Replacing fiber filter cartridge and constant-flow regulator valve

(1) When to replace

If the water flow is small even though the supply pressure is within the specified range, the fiber filter or constant-flow regulator valve is clogged or has deteriorated. Specifically, when one of the following alarms is issued in the self-diagnostic error mode, clogging or deterioration of the filter or washer should be suspected, if nothing else:

- [1] "Wash error" [Wash F]
- [2] "Reagent injection error" [Injection F]
- [3] "Wash water flow insufficient" [Wash Flow F]

The lifespan of the fiber filter should be about a year on city water, but may be shorter depending on the water quality and supply pressure. Even if none of the above alarms is issued, it should be replaced after a year as a rule of thumb.

When replacing the fiber filter, also install the new constant-flow regulator washer that comes with the replacement filter.

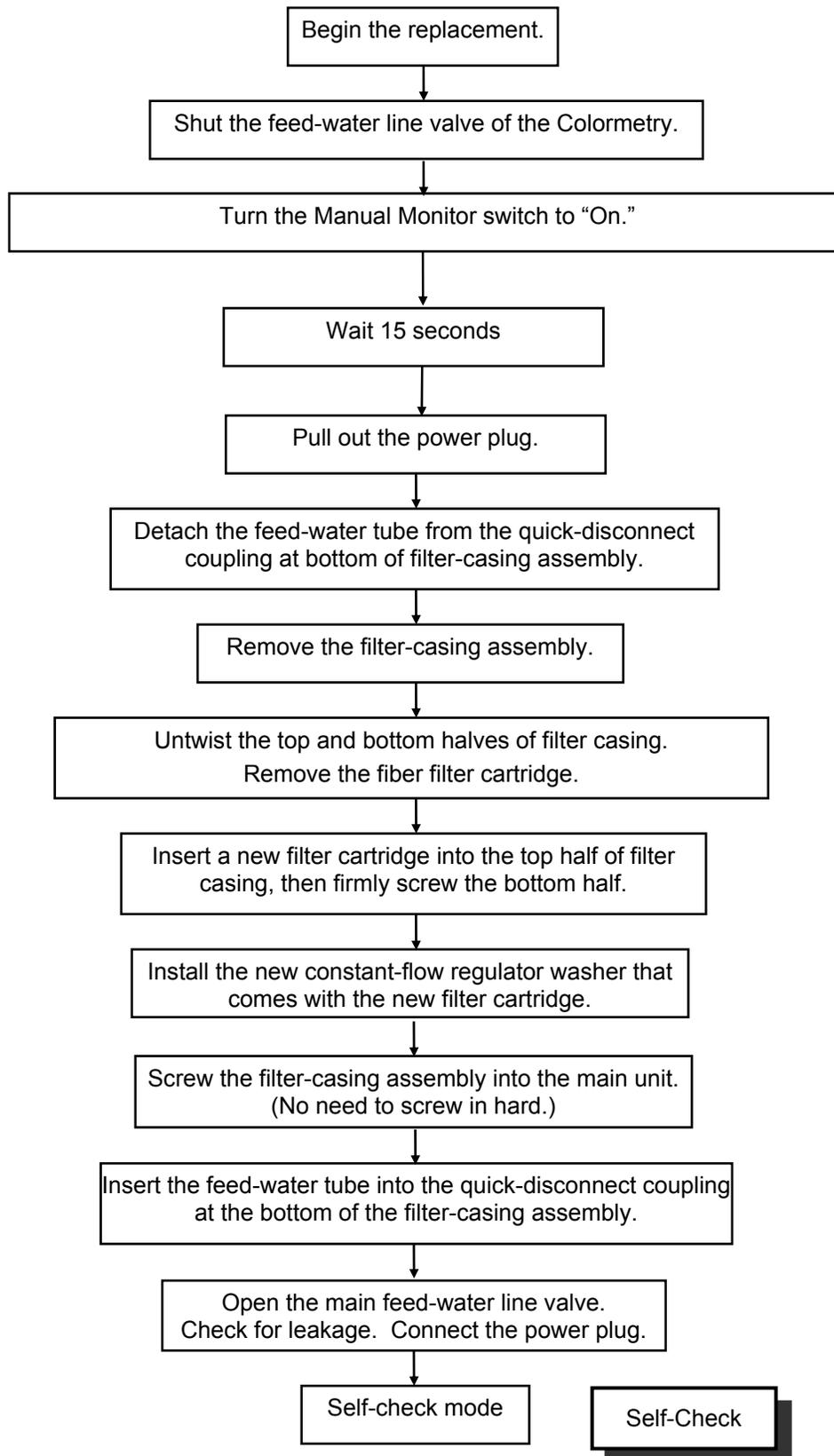
(2) How to replace

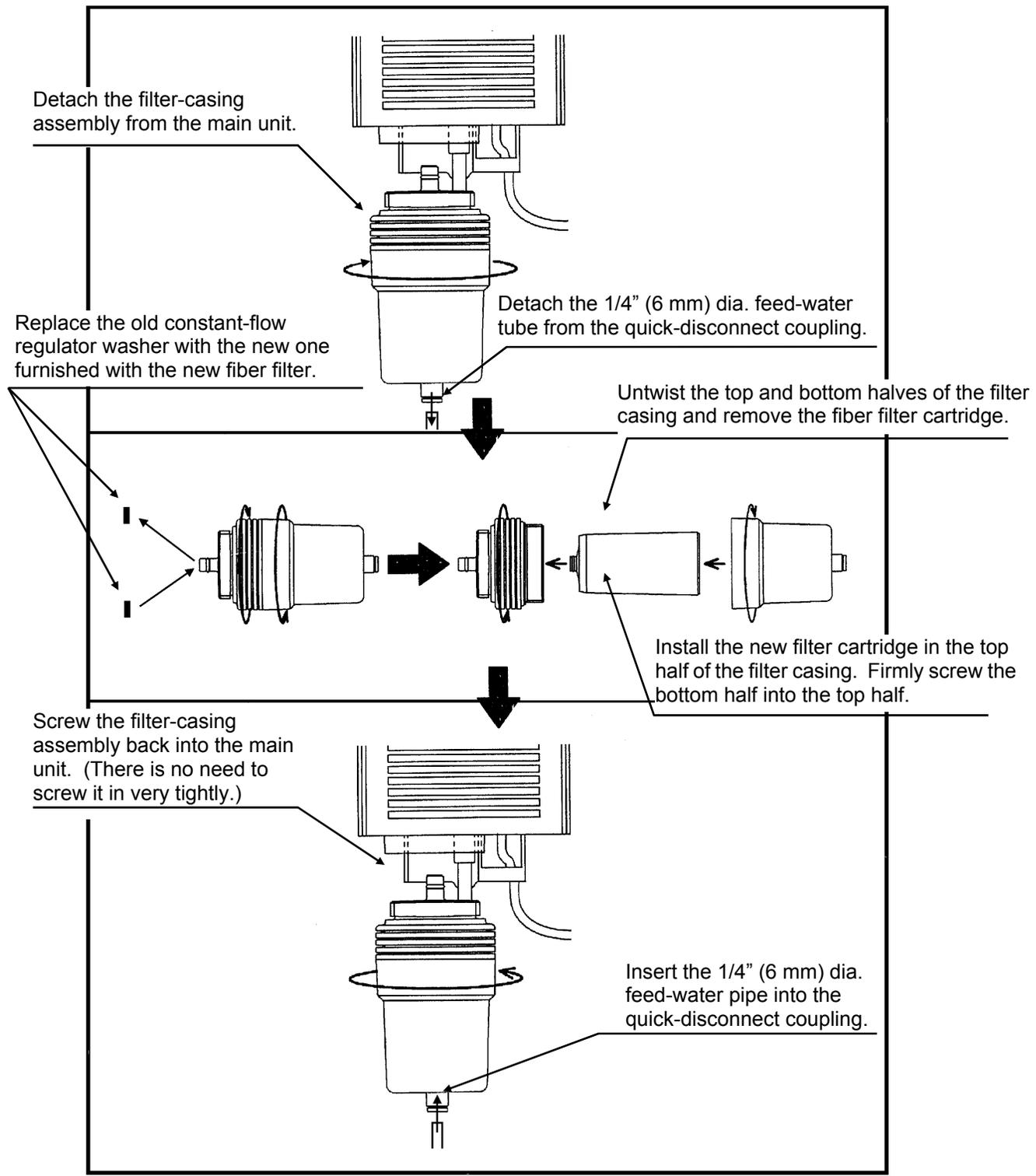
CAUTION

Water spills around the main unit when replacing the fiber filter. Do not leave things underneath the unit that should not get wet.

CAUTION

There is a constant-flow regulator washer on the end of the filter casing. If the washer is not found on the filter casing when it is removed from the main unit, the washer may have been left behind in the filter mount of the main unit. Remove the washer without scratching the mount.





Chapter 9 Troubleshooting

Explains what action should be taken in the event of error, how to clear alarm and how to verify error records.

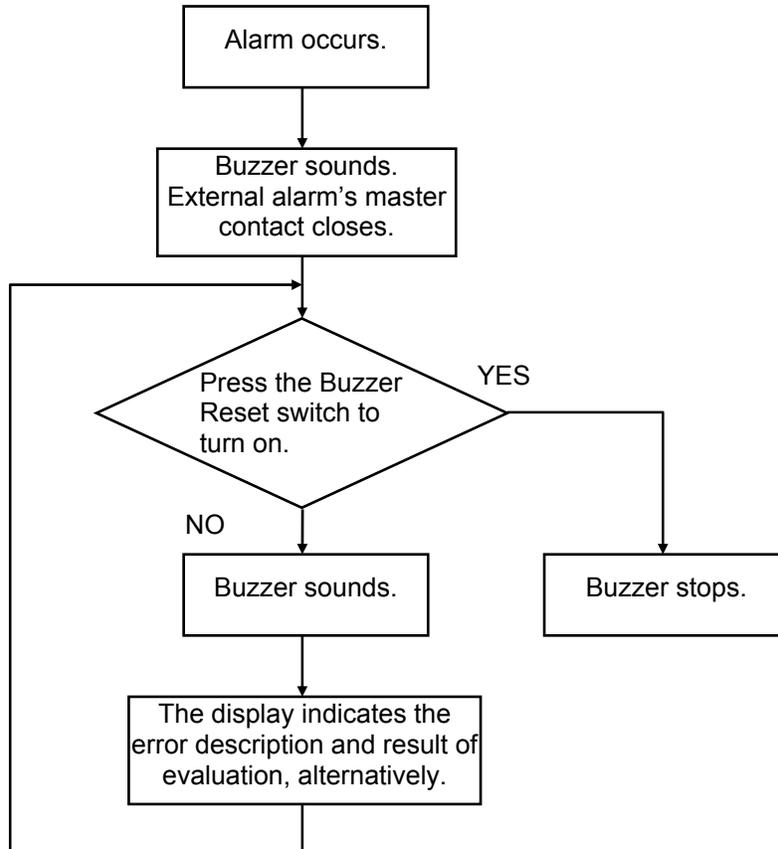
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9-1 About error indications and how to clear alarms

On the occurrence of an error, a typical example of a possible cause of the error is indicated in the LCD display. Refer to the "Troubleshooting" flowchart for other causes. If an error could not be cleared, contact your dealer immediately.

Error indications on an alarm (common to all errors in the self-check error mode)

When an error occurs, the system sounds a buzzer and the external alarm's master output contact closes. The LCD display will alternately indicate the error description and most recent result of evaluation (or, "****.- - -," if no evaluation is being made). (Note: Only the error description will be indicated in case of a DIP switch setting error.)

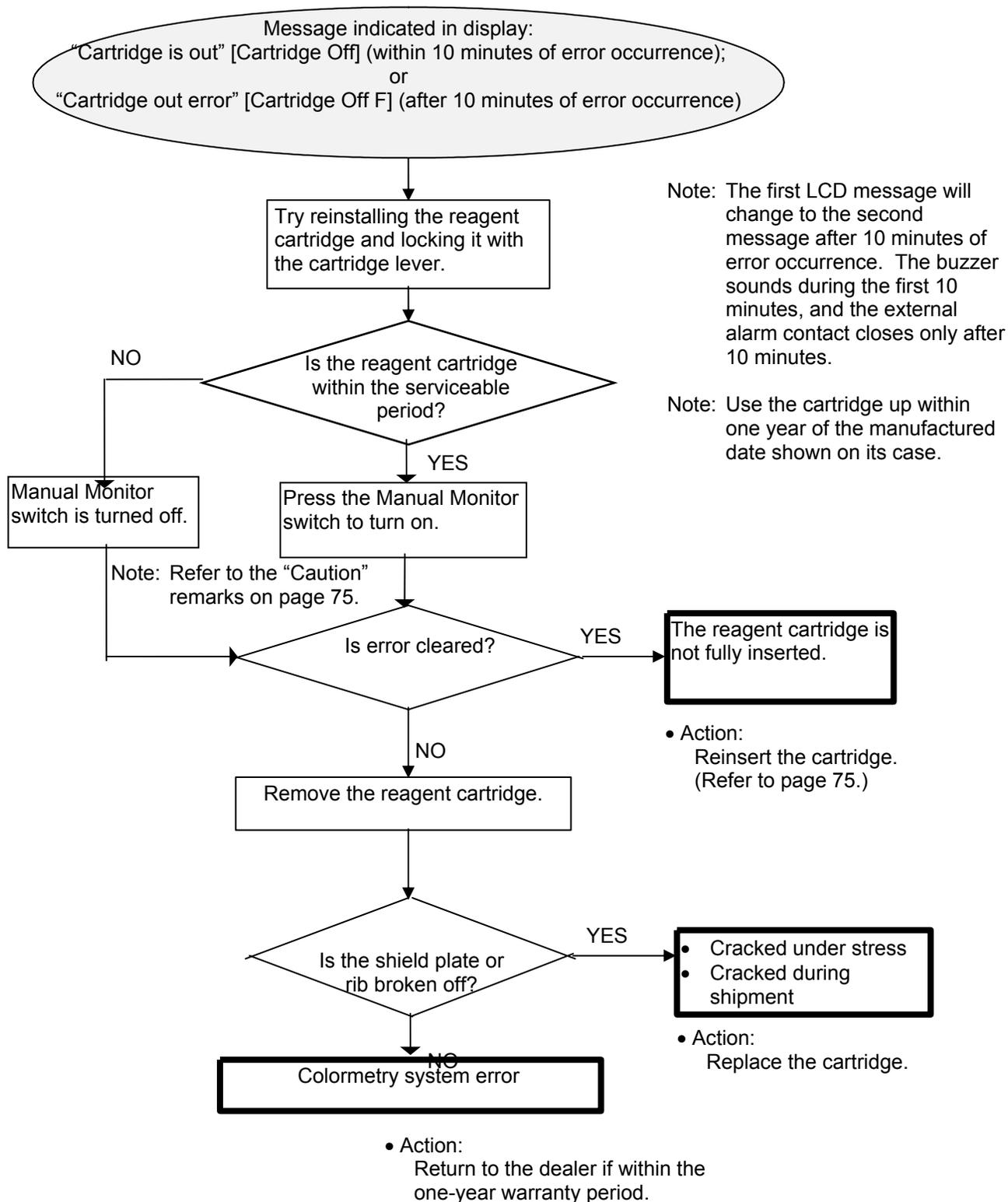


How to clear alarm

- With the buzzer sounding, press the Buzzer Reset (Manual Monitor) switch to stop it. Pressing the switch will not start the Manual-monitoring mode. Pressing the switch once again will start the Self-check or Monitor mode. The external alarm's master contact will not be reset until the condition is evaluated as normal again.
- If the conditions for monitoring are satisfied, monitoring will start even if an alarm is on. Alarm will automatically be cleared if the cause for system error is solved. However, if the error is due to disattachment of the cartridge, monitoring (self-check mode) will not start until attachment of the cartridge is confirmed. Monitoring will not start either on a DIP switch setting error, until the correct settings are made and system is restarted.

Note: The Buzzer Reset switch also functions as the Manual Monitor switch.

9-2 Troubleshooting



Message indicated in display:
"Pump confirmation error" [Pump Cfm F] (occurs during verification of the pump in the self-check mode);
or
"Pump error" [Pump F] (occurs during reagent injection in the normal monitor mode)

Note: The alarm is due to a failure to verify the pump being in its home position.

Press the reagent into the main unit.

Press the Manual Monitor switch to start monitoring.
Wait for a while.

Does the error recur?

NO

Cause: The cartridge is not properly inserted, foreign matter is stuck inside or the cartridge tube is obstructed.

• Action:
After monitoring, check for foreign matter, tube dislodge from the cartridge or reagent leakage.

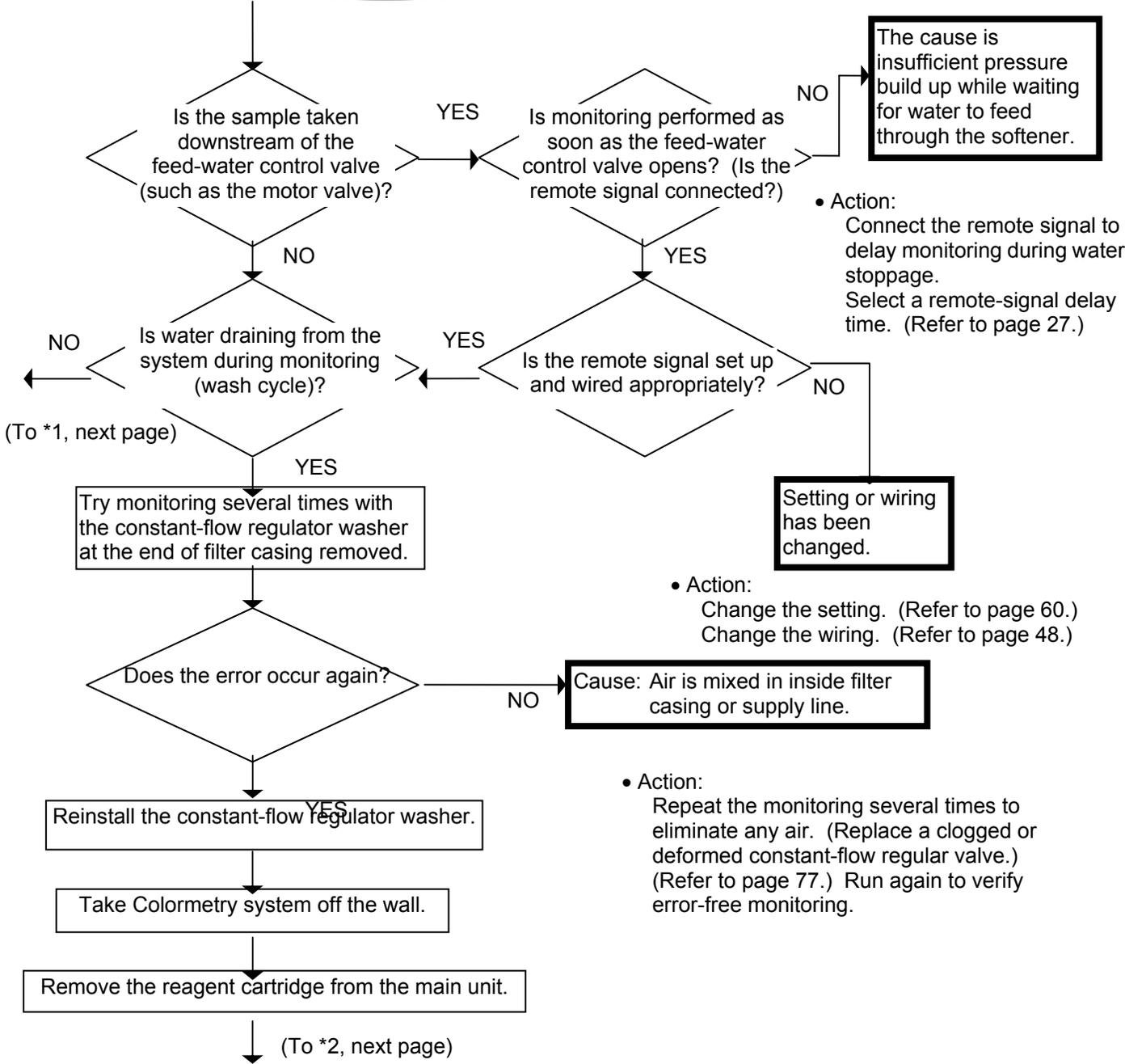
YES

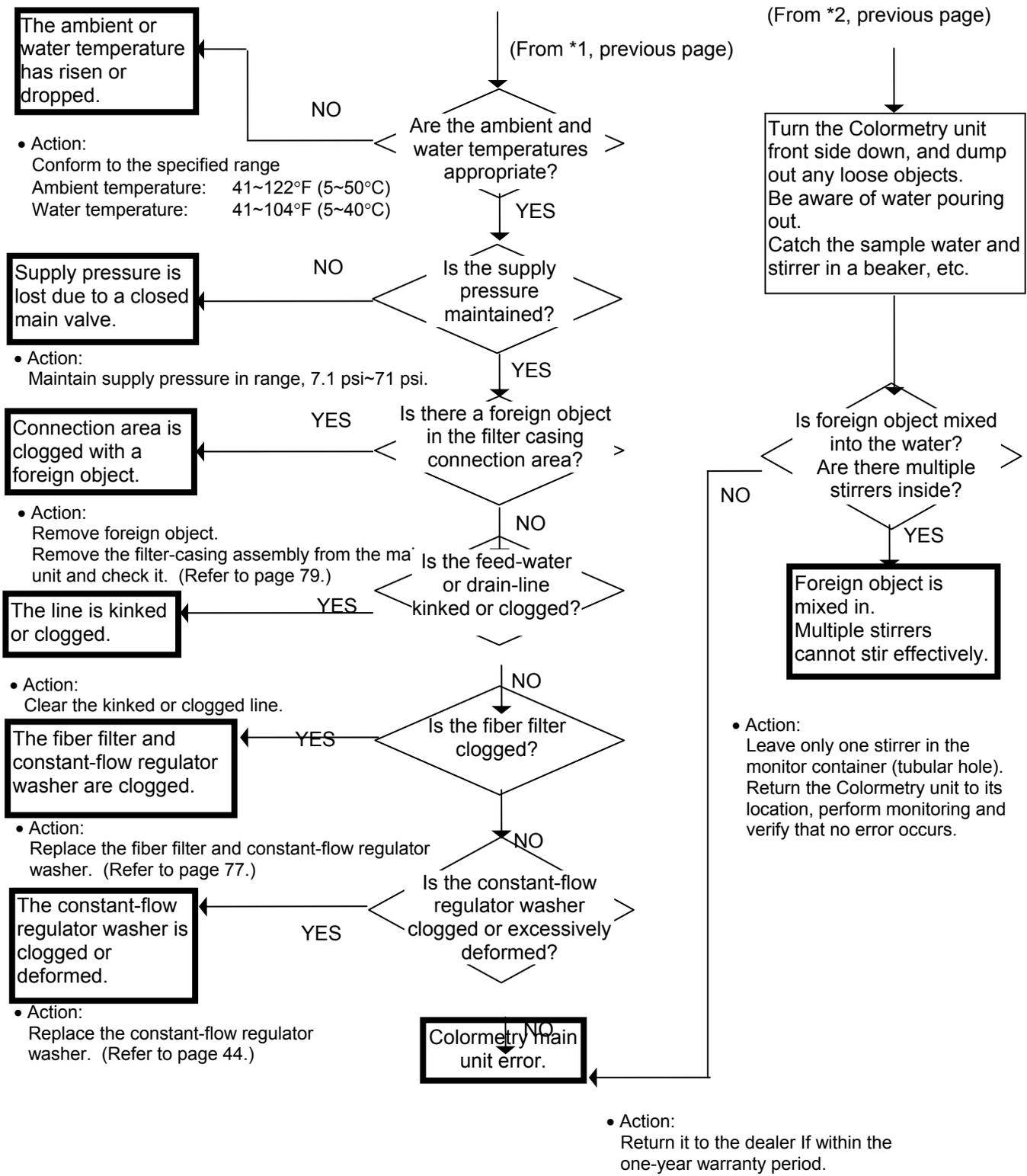
Colormetry system error

• Action:
Return it to the dealer if within the one-year warranty period.

Message indicated in display:
 "Wash confirmation error" [Wash Cfm F] (occurs during verification of wash in the self-check mode);
 or
 "Wash error" [Wash F] (occurs during verification of wash in the normal monitor mode).

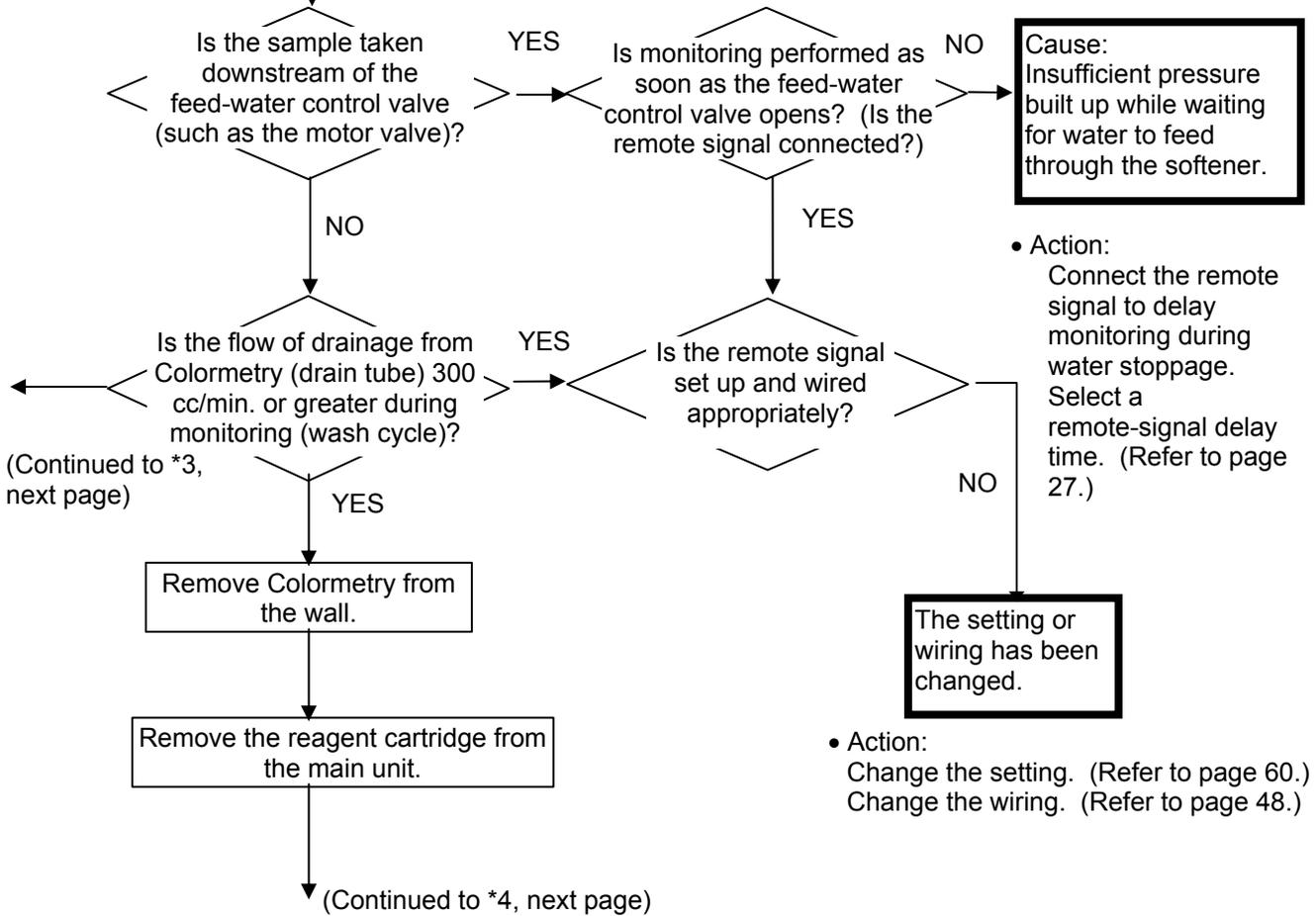
Note: The cause is insufficient water flow, bubbles in the monitor container or foreign matter mixed in with the water.

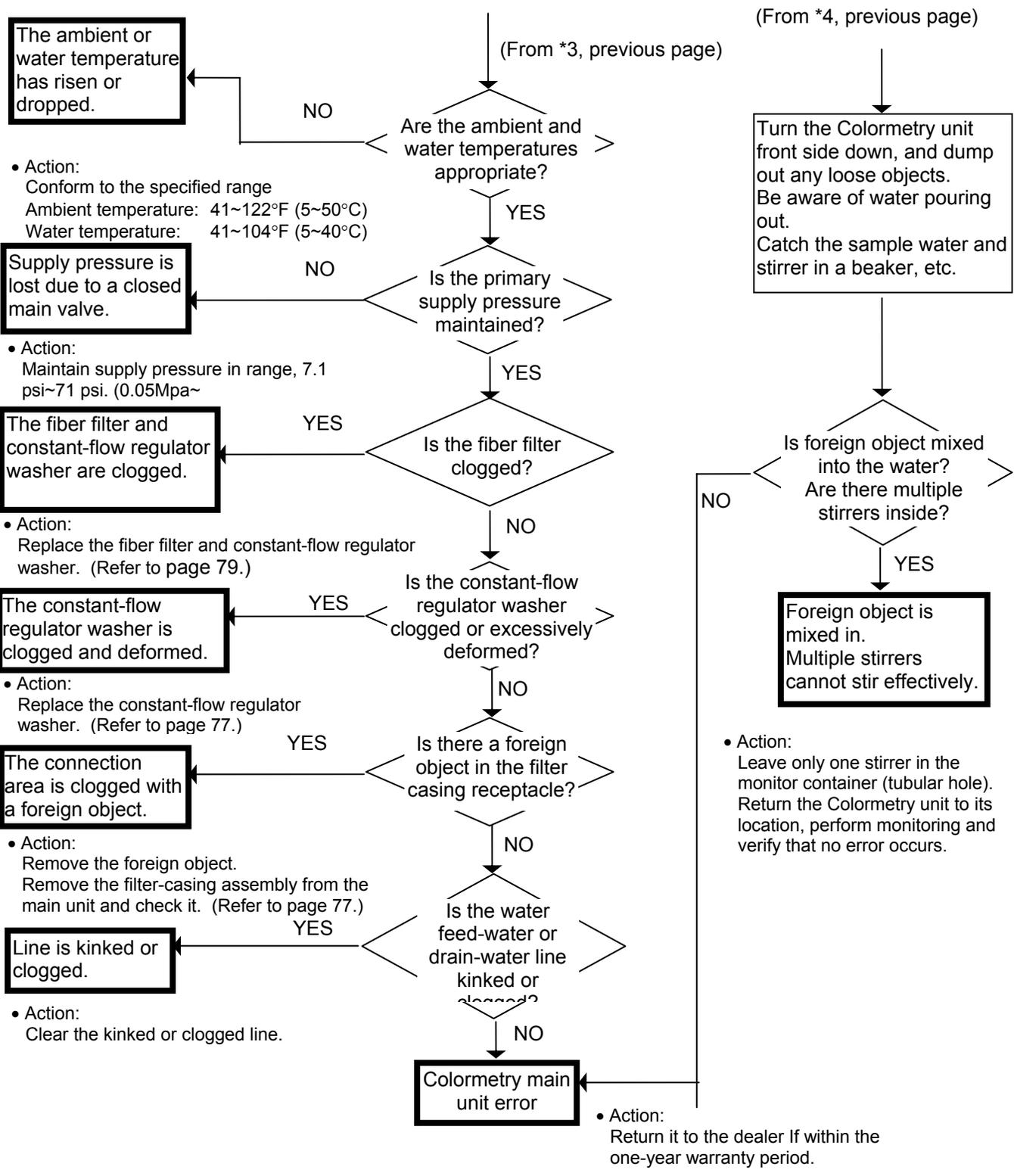




Message indicated in the display:
"Wash flow insufficient" [Wash Flow F]

Note: The cause of the alarm is a drain flow that is less than 250 cc/min., continuously repeated three times.

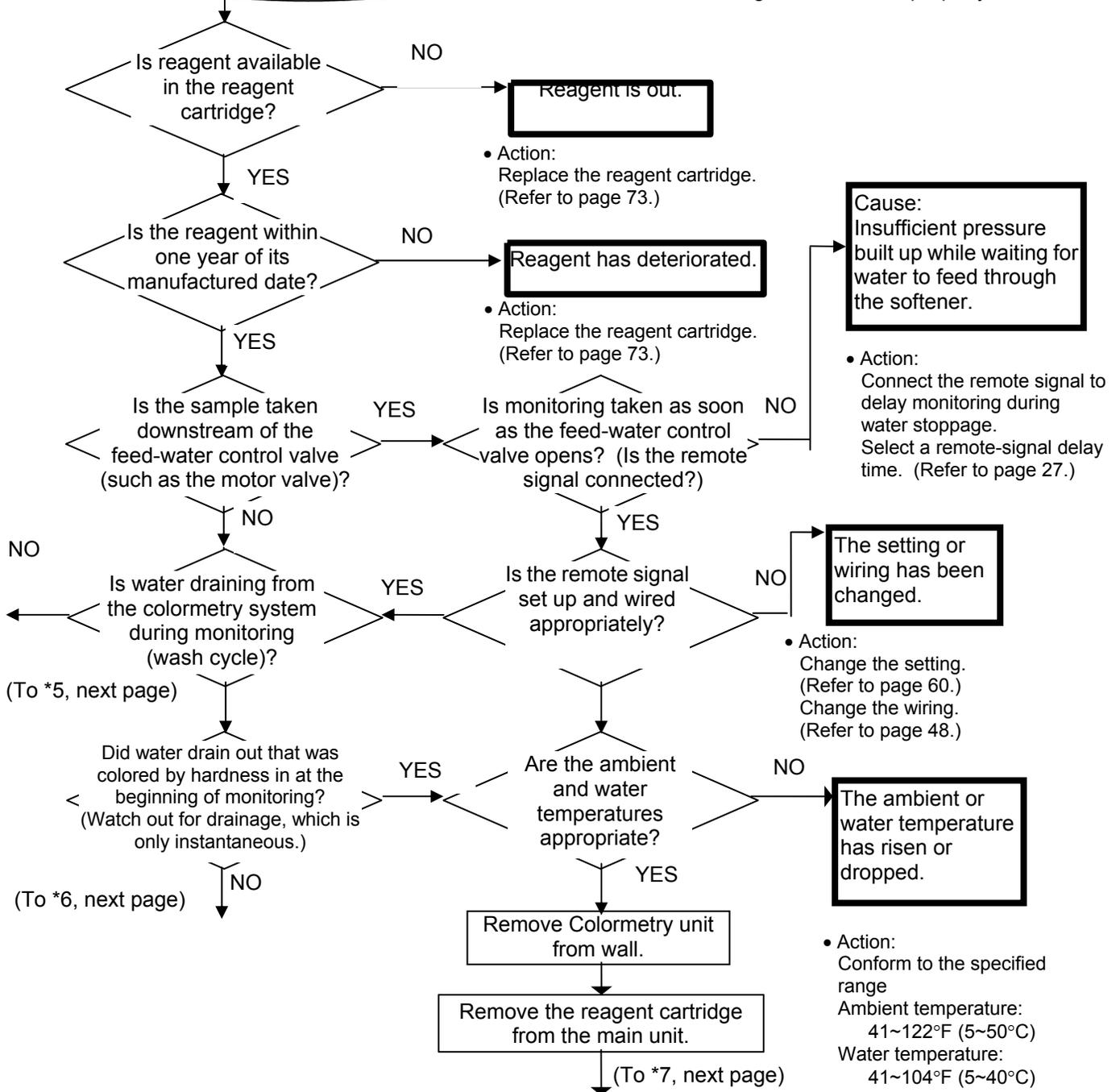


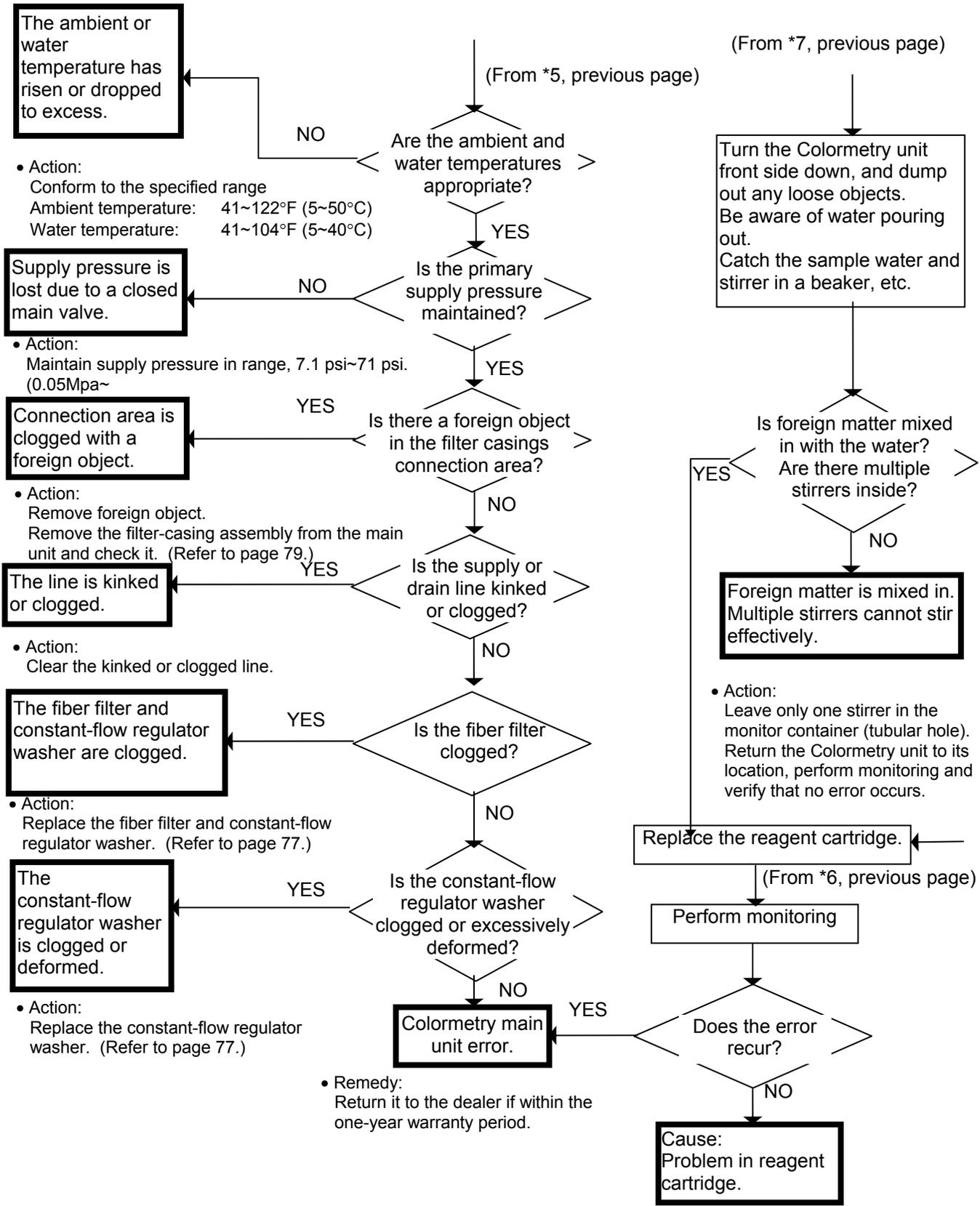


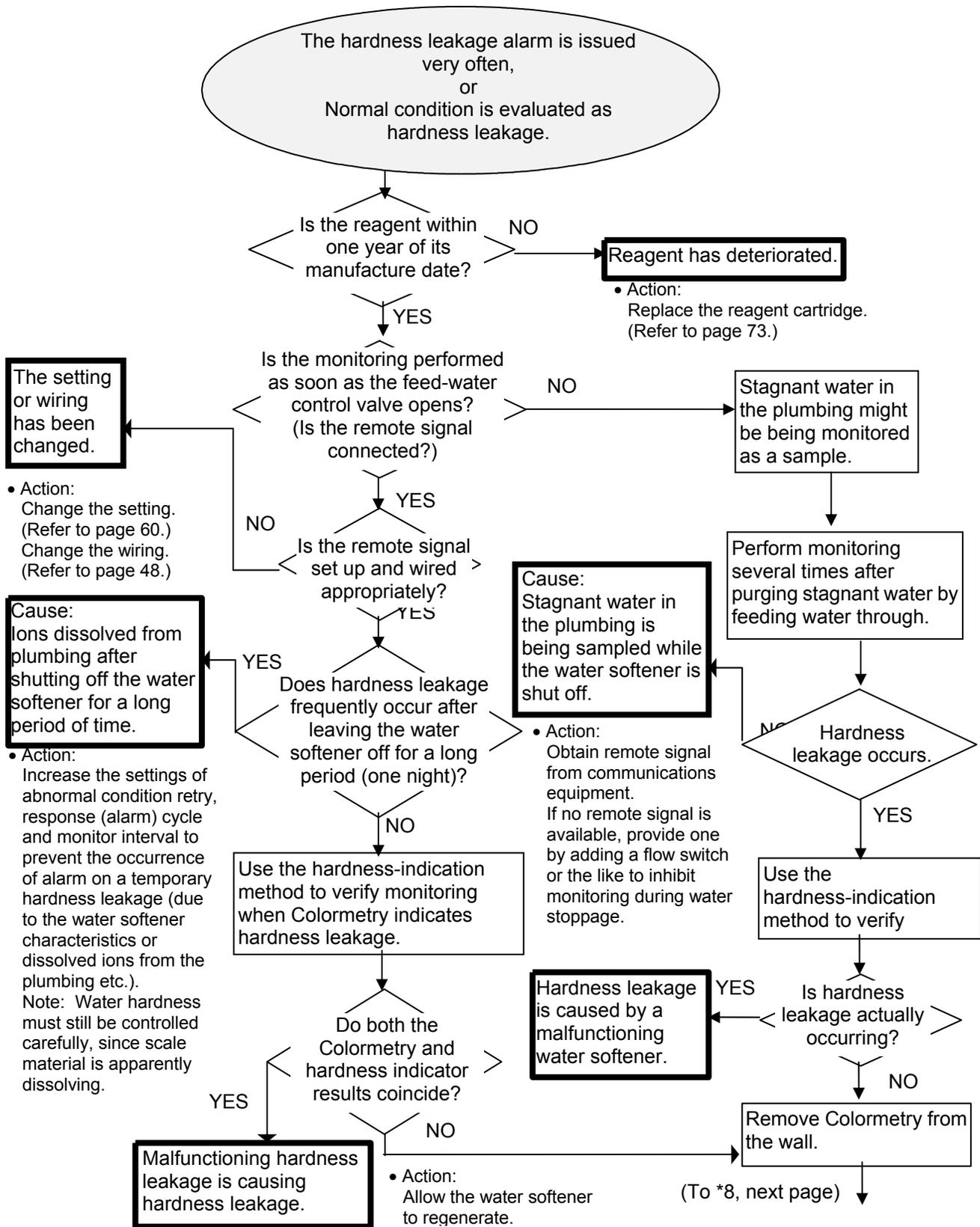
Message indicated in the display:
 “Reagent injection confirmation error” [Injection Cfm F]
 (occurs during verification of wash in the self-check mode);
 or
 “Reagent injection error” [Injection F] (occurs during
 verification of wash in the normal monitor mode)

Note: Causes:

- There is insufficient water flow.
- The amount of reagent injected is outside the specified range.
- Stirring is not effected properly.







(From *8, previous page)

Remove the reagent cartridge from the main unit.

Turn the Colormetry unit front side down, and dump out any loose objects. Be aware of water pouring out.
* Catch the sample water and stirrer in a beaker, etc.

Does a stirrer fall out?
Is foreign matter mixed into the water?

NO

Foreign matter is mixed in. Multiple stirrers cannot stir effectively.

• Action:
Remove any foreign matter. Leave only one stirrer in the monitor container (tubular hole). Return the Colormetry unit to its location, perform monitoring and verify that no error occurs.

Note: Metal ions, Zn, Cu, etc., react the same way as the hardness indication method.

• Results of evaluation of zinc ions by Colormetry

Unit: mg/L

	Zn concentration		
	0.5	1.0	2.0
Total hardness 0	1	1.5	3
Total hardness 1	2	2.5	5

• Results of evaluation of copper ions by Colormetry

Unit: mg/L

	Cu concentration		
	0.5	1.0	2.0
Total hardness 0	0.75	1.8	5
Total hardness 1	2	3.3	5

• Results of evaluation of iron-ion concentration by Colormetry
Colormetry monitoring is not especially affected by iron.

YES

Return the stirrer to the monitor container (tubular hole). Return the Colormetry unit to its location and perform monitoring.

Collect drain water from the Colormetry system and perform a water analysis (for Ca, Mg, Zn and Cu).

Are the results of analysis normal?

YES

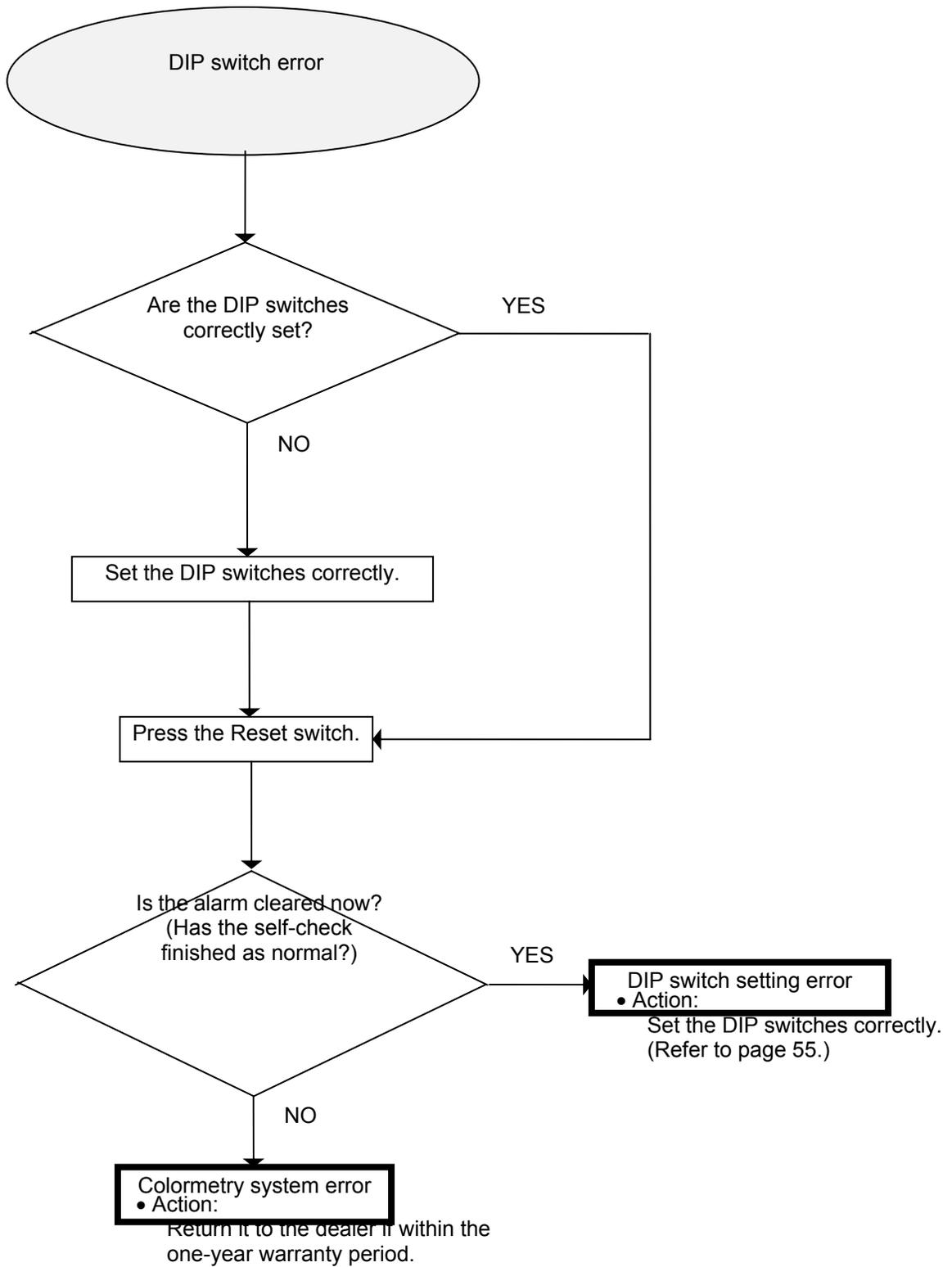
Trace hardness leakage due to water-softener problems. Excessive amount of metal ion dissolution from the plumbing and elsewhere.

• Action:
Allow the water softener to regenerate. Check out the plumbing for corrosion. Avoid the use of material that is prone to dissolution of metallic ions (such as white gas plumbing).

NO

Colormetry system error

• Action:
Return it to the dealer if within the one-year warranty period.

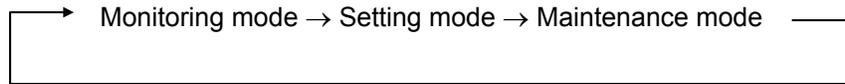


9-3 Verifying error records (How to use Maintenance mode)

Historical records of hardness leakage and system errors may be checked in Maintenance mode. Additionally, input and output status and other abnormalities may also be displayed in Maintenance mode, but they are not required during on-site repairs. Normally useful items in the records are listed below.

Starting and exiting from Maintenance mode

Each depression of the display indicator switch changes modes as follows:



- Starting Maintenance mode: Press the display indicator switch as required to start Maintenance mode.
- Exiting from Maintenance mode: Press the indicator to exit from Maintenance mode.

If no switch is operated for 10 minutes, however, the mode changes to Monitoring mode automatically.

Items displayed in Maintenance mode

In the table shown below, the items under category 1 are selected by the Item switch, and those under category 2 by the Up switch.

Category 1	Category 2	LCD display (an example)	Range of indicated values
M Result hardness		MHardness 2.0 mg/L	(Note 1)
M CPU version		MCPUver DE111012	***...CPU version
M Date(m/d/y) & time		M06/23/99 15:28	
Type of monitoring		Mhardness Mon	
M Input-output mode		MIN-OUT Mode *	(Note 2)
	M Output1	MOUT1 1111 1111	0000 0000-1111 1111
	M Output2	MOUT2 1111 1111	0000 0000-1111 1111
	M Input1	MIN1 1111 1111	0000 0000-1111 1111
	M Input1	MIN2 1111 1111	0000 0000-1111 1111
	M AD FF FF FF	MAD FF FF FF	00 00 00-FF FF FF
	M AD Thermista: FF	MAD (Thmsta): FF	00-FF
	M AD(R): FF FF	MAD(R): FF FF	00 00-FF FF
	M AD(-): 00 00	MAD(O): 00 00	
	M AD(G): FF FF	MAD(G): FF FF	00 00-FF FF
	M Pre Wash period 9.99 second	MWash Pd 9.99S	
	M Set M-alkalinity	MMAikal<60mg/L	Under 60/300 and up
	M select from LED wavelength table	MWL:L	S/L
	M Operation status	MOp Stus: FF	00-FF
M Alarm description		MAlarm Content *	
	M Error table 1	MError1: 11111111	00000000-11111111
	M Error table 2	MError2: 11111111	00000000-11111111
M Cartridge data (Note 3)		MCartridge Dta *	
	M Cartridge replacement date(m/d/y)	MC Exc 06/23/99	
	M Cartridge used hours since replacement	MC Hrs 999999	00000-999999 (hours)
	M Reagent injection frequency since cartridge replacement	MRgt Inj Fqc 9999	0000-9999 (times)

Category 1	Category 2	LCD display (an example)	Range of indicated values
M Hardness leakage record 1 (Note 4)		MLeakage Log 1	
	M Date of Hardness leakage(m/d/y)	MDate 06/23/99	
	M Time of Hardness leakage	MTime 15:28	
	M Evaluation standard at concentration	MEvl Std Conc: 2	0-2
	M AD(R): FF FF	MAD(R): FF FF	00 00-FF FF
	M AD(-): 00 00	MAD(-): 00 00	
	M AD(G): FF FF	M AD(G): FF FF	00 00-FF FF
	M Total leakage minute	MLeakage Min9999	0000-9999 (minutes)
	M Date of reset(m/d/y)	MRset 06/23/99	
M Time of reset	MRset Time 15:28		
M Hardness leakage record 2	(Same as "M Hardness leakage record 1")		
M Hardness leakage record 3	(Same as "M Hardness leakage record 1")		
M System error record 1 (Note 5)		MStm Fault Log 2	
	M Date of System error(m/d/y)	MDate 06/23/99	
	M Time of System error	MTime 15:28	
	M Error table 1	MError1: 11111111	00000000-11111111
	M Error table 2	MError2: 11111111	00000000-11111111
	M Date of reset(m/d/y)	MRset 06/23/98	
	M Time of reset	MRset Time 15:28	
M System error record 2	(Same as M system error record 1)		
M System error record 3	(Same as M system error record 1)		
M black out record 1 (Note 6)		MBlk Out Log 1 *	
	M Date of black out(m/d/y)	MDate 06/23/99	
	M Time of black out	MTime 15:28	
	M Date of reset(m/d/y)	MRset 06/23/99	
	M Time of reset	MRset Time 15:28	
M black out record 2	(Same as "M System error record 1")		
M black out record 3	(Same as "M System error record 1")		

Note 1: If the results of monitoring are in the 0—1mg/L, 1—2 mg/L , 2—5 mg/L, and 5 mg/L and up, the indicated values will be 0.0 mg/L, 1.0 mg/L, and 2.0 mg/L, and 5.0 mg/L, respectively. If the result is abnormal, the indicated value will be 9.9 mg/L.

Note 2: If a ">" symbol is indicated in the LCD display, it means there is an item to be selected by Up switch. Normally, the procedure is not utilized except in case of "M Set M-alkalinity."

Note 3: The category indicates the date of cartridge installation, cumulative hours used and number of times used (number of times the injection pump has operated) since the date of installation. When the number of hours or times used has reached 3,500 hours or times, a message to replace the reagent cartridge is displayed.

Note 4: The historical data for up to three most recent occurrences of hardness leakage is stored. The cumulative operating time of hardness leakage, [M Total leakage minutes], counts time only if the remote signal function is set for "Monitoring in remote signal-on state."

Note 5: The historical data for up to three most recent system errors is stored in this category. The error table for the category describes previously occurred system errors. The LCD indications of the error table in this category also corresponds to the table referred to in Note 5. The LCD display will indicate [1] for the description of an error, as is the case with Note 6.

<Error table>

	B7	B6	B5	B4	B3	B2	B1	B0
Error code (1)	Replace reagent	Reagent-injection error	Reagent injection-pump error	Light-receptor error	Wash error	Reagent-injection error (K)	Wash error (K)	Reagent injection-pump error (K)
Error code (2)	Abnormal concentration	***	***	***	***	Decreased sample flow	DIP switch setting error	Cartridge out

Note: The notation (K) shows an error that has occurred in the self-check mode only.

Note 6: The historical data will be stored on up to three most recent power outage.

The error code describes an error currently occurring in the system. An error and a normal state are indicated by a [1] and [0], respectively.

[Example] In case of a reagent-injection error
 Displays: M Table 1 = 0100 0000

9-4 How to reset

Ordinarily, no resetting action is required.

(1) Normal reset

All setting data and historical data is preserved when a reset is executed.

[1] How to execute a reset

Detach the front cover from the front side of the main unit, then press the Reset switch.

[2] How system operates when the Reset switch is pressed

Refer to Section 6-2-1, "(1) If the data-memory backup battery has been charged by the time the power is turned on, or when reinitialized from a reset," on page 57.

(2) All reset

When an all reset is executed, all setting data and historical record data will be initialized.

[1] How to execute an All Reset

- a. Detach the front cover on the front of the main unit, and turn DIP switch DSW-8 to "On."
- b. With DSW-8 turned to "On," press the Reset switch.
- c. Check the display to verify that an "All clear" message is indicated following a "CPU version" message. When the "All clear" message disappears, return the DSW-8 to "Off."

[2] About the system after reset is executed

Refer to Section 6-2-1, "(2) If the data-memory backup battery has not been charged when the power is turned on, or when reinitialized after executing an complete reset," on page 57.