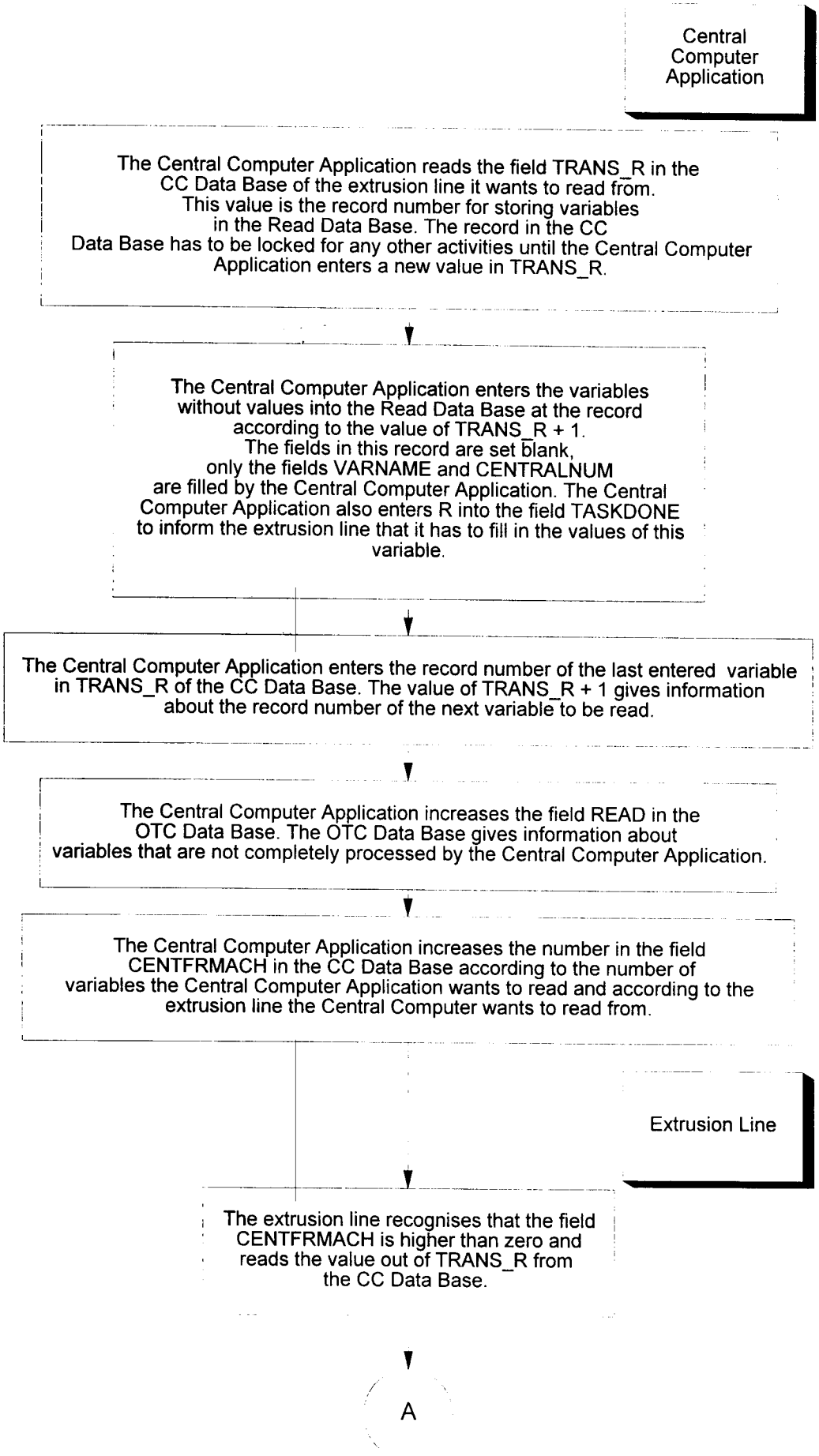
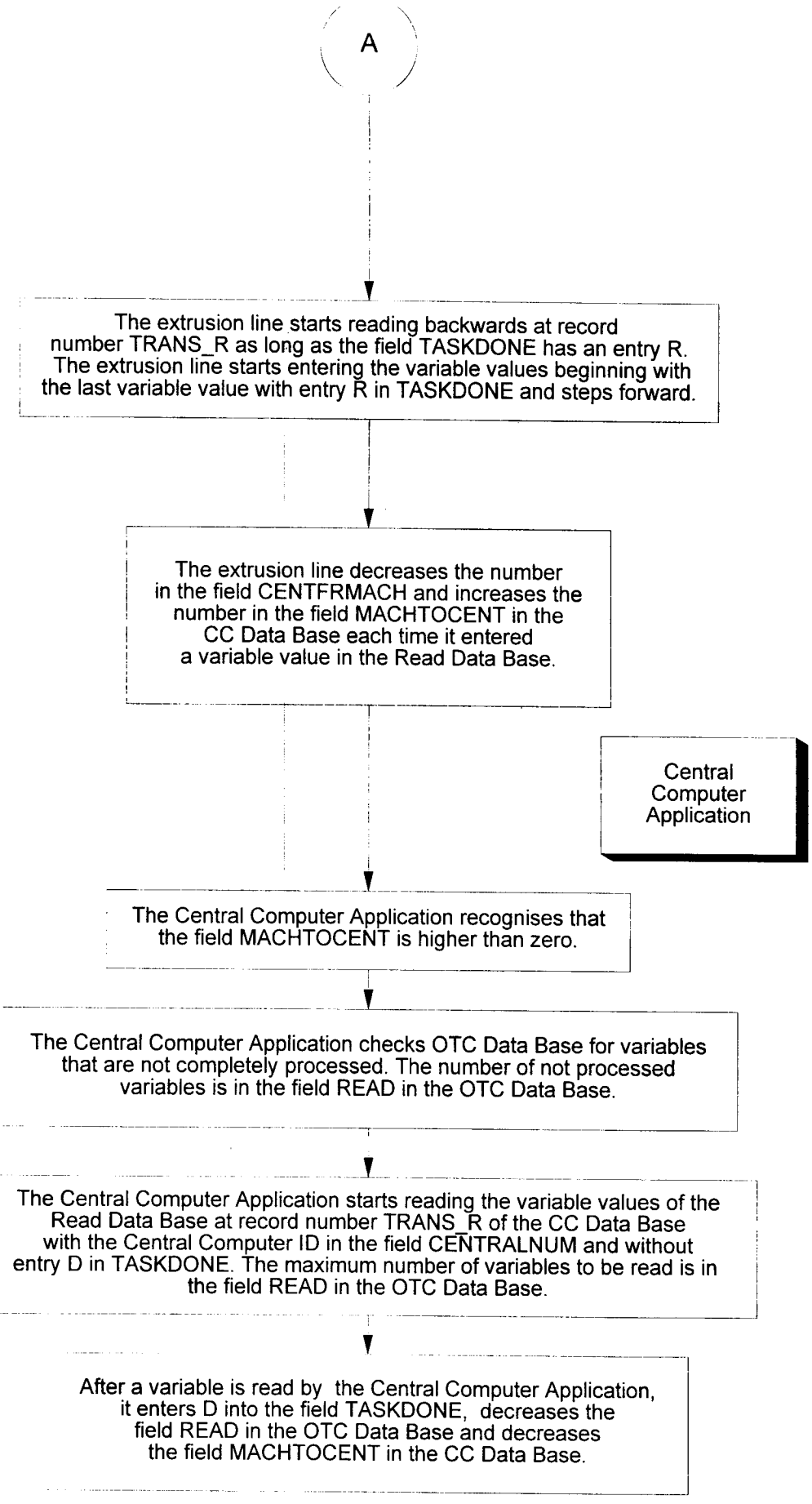

Central Computer Application
The Central Computer Application reads the field TRANS_R in the CC Data Base of the extrusion line it wants to read from. This value is the record number for storing variables in the Read Data Base. The record in the CC Data Base has to be locked for any other activities until the Central Computer Application enters a new value in TRANS_R.
The Central Computer Application enters the variables without values into the Read Data Base at the record according to the value of TRANS_R + 1. The fields in this record are set blank, only the fields VARNAME and CENTRALNUM are filled by the Central Computer Application. The Central Computer Application also enters R into the field TASKDONE to inform the extrusion line that it has to fill in the values of this variable.
The Central Computer Application enters the record number of the last entered variable in TRANS_R of the CC Data Base. The value of TRANS_R + 1 gives information about the record number of the next variable to be read.
The Central Computer Application increases the field READ in the OTC Data Base. The OTC Data Base gives information about variables that are not completely processed by the Central Computer Application.
The Central Computer Application increases the number in the field CENTFRMACH in the CC Data Base according to the number of variables the Central Computer Application wants to read and according to the extrusion line the Central Computer wants to read from.
Extrusion Line
The extrusion line recognises that the field CENTFRMACH is higher than zero and reads the value out of TRANS_R from the CC Data Base.
A


A
The extrusion line starts reading backwards at record number TRANS_R as long as the field TASKDONE has an entry R. The extrusion line starts entering the variable values beginning with the last variable value with entry R in TASKDONE and steps forward.
The extrusion line decreases the number in the field CENTFRMACH and increases the number in the field MACHTOCENT in the CC Data Base each time it entered a variable value in the Read Data Base.
Central Computer Application
The Central Computer Application recognises that the field MACHTOCENT is higher than zero.
The Central Computer Application checks OTC Data Base for variables that are not completely processed. The number of not processed variables is in the field READ in the OTC Data Base.
The Central Computer Application starts reading the variable values of the Read Data Base at record number TRANS_R of the CC Data Base with the Central Computer ID in the field CENTRALNUM and without entry D in TASKDONE. The maximum number of variables to be read is in the field READ in the OTC Data Base.
After a variable is read by the Central Computer Application, it enters D into the field TASKDONE, decreases the field READ in the OTC Data Base and decreases the field MACHTOCENT in the CC Data Base.

### 4.9.2 Central Computer Application writes to Extrusion Line

The following data bases are used for the Write Service

Communication Control Data Base 1 to N , CC 1 to CC N

| CENTFRMACH | MACHTOCENT | CENTTOMACH | REPORT | TRANS_R | TRANS_W | TRANS_RP | CENTUP | CENTDOWN | MACHUP | MACHDOWN |
|---|---|---|---|---|---|---|---|---|---|---|
| INTEGER | INTEGER | INTEGER | INTEGER | INTEGER | INTEGER | INTEGER | INTEGER | INTEGER | INTEGER | INTEGER |
| | | | | | | | | | | |
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Write Data Base 1 to N, WD 1 to WD N

| VARNAME | V | S | I | R | N | TASKDONE | TRANSTIME | CENTRALNUM |
|---|---|---|---|---|---|---|---|---|
| VARCHAR(16) | LONG VARCHAR | SMALLINT | INTEGER | REAL | NUMERIC | VARCHAR(1) | VARCHAR(15) | SMALLINT |
| | | | | | | | | |
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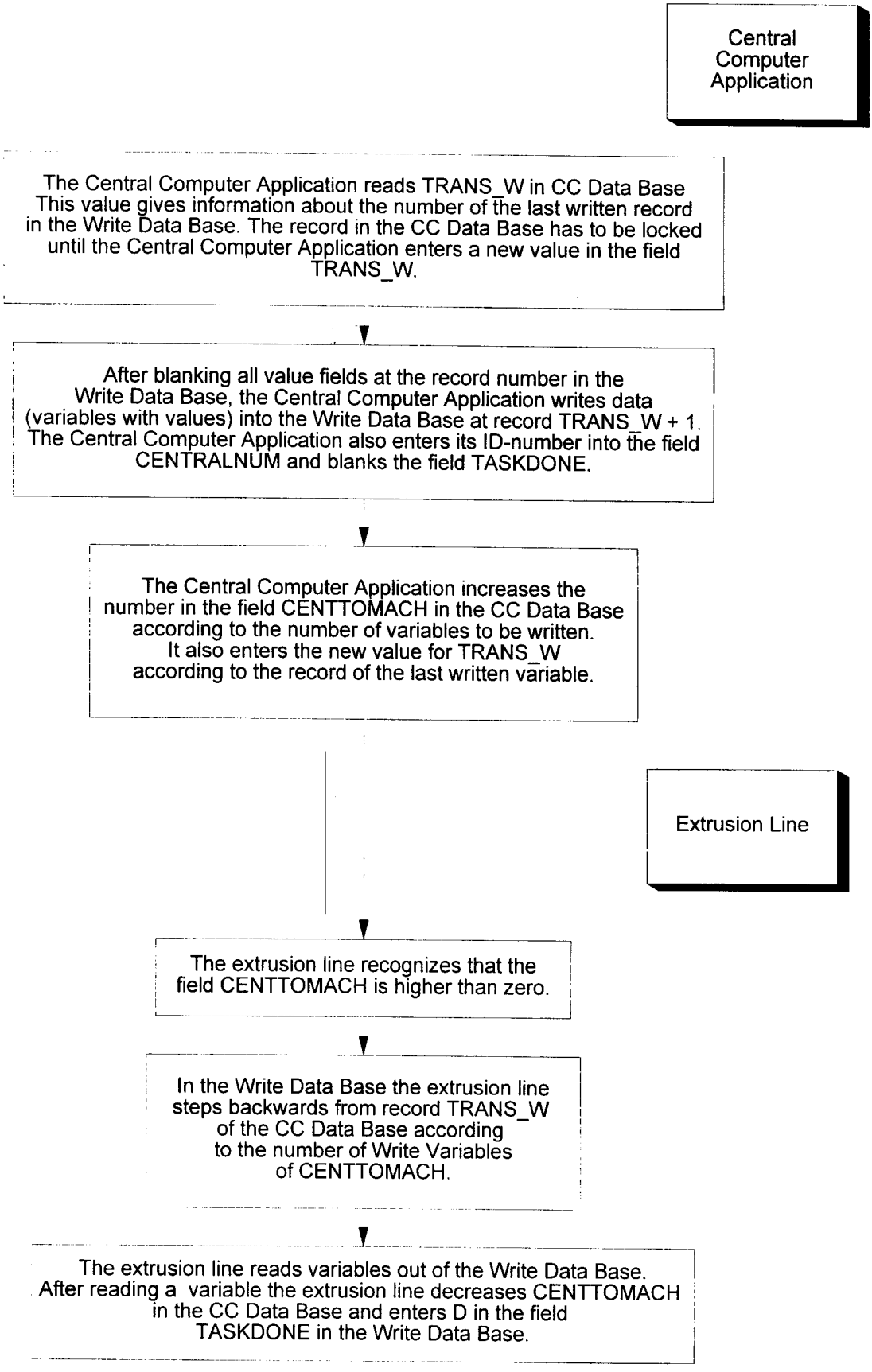
Central Computer Application
The Central Computer Application reads TRANS_W in CC Data Base This value gives information about the number of the last written record in the Write Data Base. The record in the CC Data Base has to be locked until the Central Computer Application enters a new value in the field TRANS_W.
After blanking all value fields at the record number in the Write Data Base, the Central Computer Application writes data (variables with values) into the Write Data Base at record TRANS_W + 1. The Central Computer Application also enters its ID-number into the field CENTRALNUM and blanks the field TASKDONE.
The Central Computer Application increases the number in the field CENTTOMACH in the CC Data Base according to the number of variables to be written. It also enters the new value for TRANS_W according to the record of the last written variable.
Extrusion Line
The extrusion line recognizes that the field CENTTOMACH is higher than zero.
In the Write Data Base the extrusion line steps backwards from record TRANS_W of the CC Data Base according to the number of Write Variables of CENTTOMACH.
The extrusion line reads variables out of the Write Data Base. After reading a variable the extrusion line decreases CENTTOMACH in the CC Data Base and enters D in the field TASKDONE in the Write Data Base.

### 4.9.3 Extrusion Line reports to Central Computer Application

The following data bases are used for the Information Report

Report Control Data Base 1 to N RpC 1 to RpC N

| VARNAME | EVENT | TIME | ONOFF | CENTRALNUM |
|---|---|---|---|---|
| VARCHAR(16) | VARCHAR(1) | INTEGER | VARCHAR(3) | SMALLINT |
| | | | | |
| | | | | |
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| | | | | |

Open Transactions Data Base 1 to N, OTC 1 to OTC N

| CENTRALNUM | READ | WRITE | REPORT |
|---|---|---|---|
| SMALLINT | SMALLINT | SMALLINT | VARCHAR(1) |
| | | | |
| | | | |
| | | | |
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Report Data Base 1 to N, RpD 1 to RpD N

| VARNAME | V | S | I | R | N | TASKDONE | TRANSTIME | CENTRALNUM |
|---|---|---|---|---|---|---|---|---|
| VARCHAR(16) | LONG VARCHAR | SMALLINT | INTEGER | REAL | NUMERIC | VARCHAR(1) | VARCHAR(15) | SMALLINT |
| | | | | | | | | |
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Communication Control Data Base 1 to N, CC 1 to CC N

| CENTFRMACH | MACHTOCENT | CENTTOMACH | REPORT | TRANS_R | TRANS_W | TRANS_RP | CENTUP | CENTDOWN | MACHUP | MACHDOWN |
|---|---|---|---|---|---|---|---|---|---|---|
| INTEGER | INTEGER | INTEGER | INTEGER | INTEGER | INTEGER | INTEGER | INTEGER | INTEGER | INTEGER | INTEGER |
| | | | | | | | | | | |
| | | | | | | | | | | |
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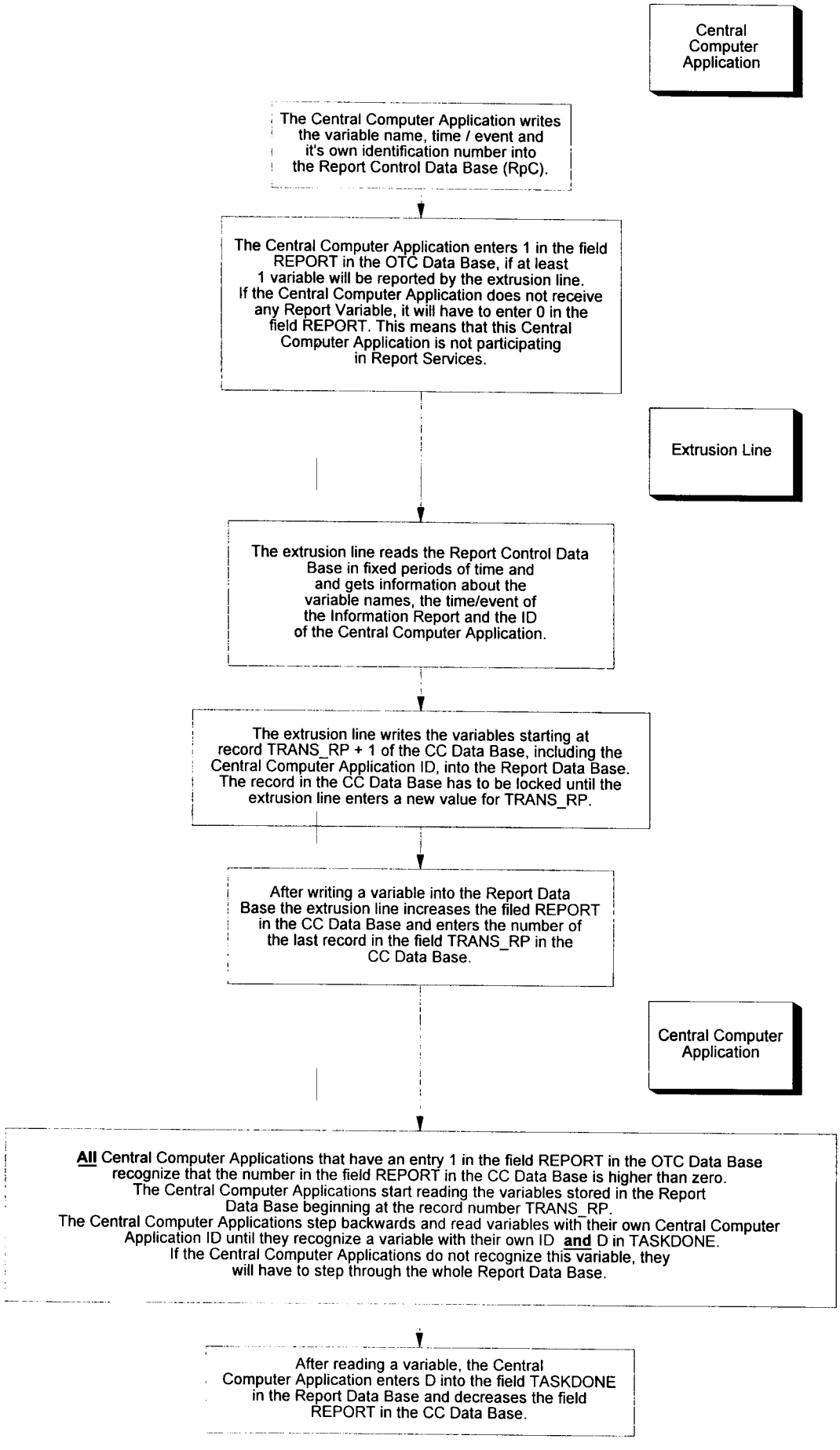
Central Computer Application
The Central Computer Application writes the variable name, time / event and it's own identification number into the Report Control Data Base (RpC).
The Central Computer Application enters 1 in the field REPORT in the OTC Data Base, if at least 1 variable will be reported by the extrusion line. If the Central Computer Application does not receive any Report Variable, it will have to enter 0 in the field REPORT. This means that this Central Computer Application is not participating in Report Services.
Extrusion Line
The extrusion line reads the Report Control Data Base in fixed periods of time and and gets information about the variable names, the time/event of the Information Report and the ID of the Central Computer Application.
The extrusion line writes the variables starting at record TRANS_RP + 1 of the CC Data Base, including the Central Computer Application ID, into the Report Data Base. The record in the CC Data Base has to be locked until the extrusion line enters a new value for TRANS_RP.
After writing a variable into the Report Data Base the extrusion line increases the filed REPORT in the CC Data Base and enters the number of the last record in the field TRANS_RP in the CC Data Base.
Central Computer Application
All Central Computer Applications that have an entry 1 in the field REPORT in the OTC Data Base recognize that the number in the field REPORT in the CC Data Base is higher than zero. The Central Computer Applications start reading the variables stored in the Report Data Base beginning at the record number TRANS_RP. The Central Computer Applications step backwards and read variables with their own Central Computer Application ID until they recognize a variable with their own ID and D in TASKDONE. If the Central Computer Applications do not recognize this variable, they will have to step through the whole Report Data Base.
After reading a variable, the Central Computer Application enters D into the field TASKDONE in the Report Data Base and decreases the field REPORT in the CC Data Base.

### 4.9.4 Block Transfer of Variable Values

EUROMAP 26 offers the possibility of block transfer of variable values. This means that different variable values can be grouped to blocks and transferred at one time. It is possible to build up to 100 blocks. This way realises the transmission of a huge amount of data (e. g. blown film plants with profile point 1 to 360 or temperature zones 1 to 10) by using only one communication service.

The variable values that are exchanged by block transfer will be marked by the Central Computer Application in the Report Control Data Base (Figure 6).

| VARNAME | EVENT | TIME | ONOFF | CENTRALNUM |
|---|---|---|---|---|
| VARCHAR(16) | VARCHAR(1) | INTEGER | VARCHAR(3) | SMALLINT |
| | | | | |
| | | | | |
| | | | | |
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**Figure 6: Report Control Data Base**

To mark a variable as a Block Transfer Variable, the Central Computer Application enters the block name „B1" to „B99" into the field ONOFF. It also enters the Central Computer Application ID into the field CENTRALNUM and the time or the event, the variable is transmitted.
After reading the Report Control Data Base, the Extrusion Line Control or the Extrusion Line PC knows the variable names to be grouped to a block, the block name and to which Central Computer Application the block must be transferred.

If the transmission time of variables of one block is different, the extrusion line transfers the block according to the shortest period of time that is entered in the field TIME. If the field EVENT is filled by the Central Computer Application, the Extrusion Line transfers the block at any occurred event that is entered. It is useful to group variables of similar types, meanings and transmission times to one block.
The Extrusion Line Control transmits the variable block by using the service Information Report. All variable values are entered into the field V of the Report Data Base. The block name (B1 to B99) is entered in the field VARNAME.

| VARNAME | V | S | I | R | N | TASKDONE | TRANSTIME | CENTRALNUM |
|---|---|---|---|---|---|---|---|---|
| VARCHAR(16) | LONG VARCHAR | SMALLINT | INTEGER | REAL | NUMERIC | VARCHAR(1) | VARCHAR(15) | SMALLINT |
| | | | | | | | | |
| | | | | | | | | |
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**Figure 7: Report Data Base 1 to N**

The block data is stored as ASCII Character in the Report Data Base.
* marks the begin and the end of a variable block. The different values are separated by ;.
A variable name is not entered in this case. The Central Computer gets information from the Report Control Data Base about the values and the correct references to the variables` name and the block name.

| VARNAME | V | S |
|---|---|---|
| VARCHAR(16) | LONG VARCHAR | SMALLINT |
| B45 | *255.3;122.4;10.2;14.5;0.002;0.0045; | |
| | 124.5;97.36* | |
| | | |
| | | |
| | | |
| | | |

**Figure 8: Example of variable block transfer**

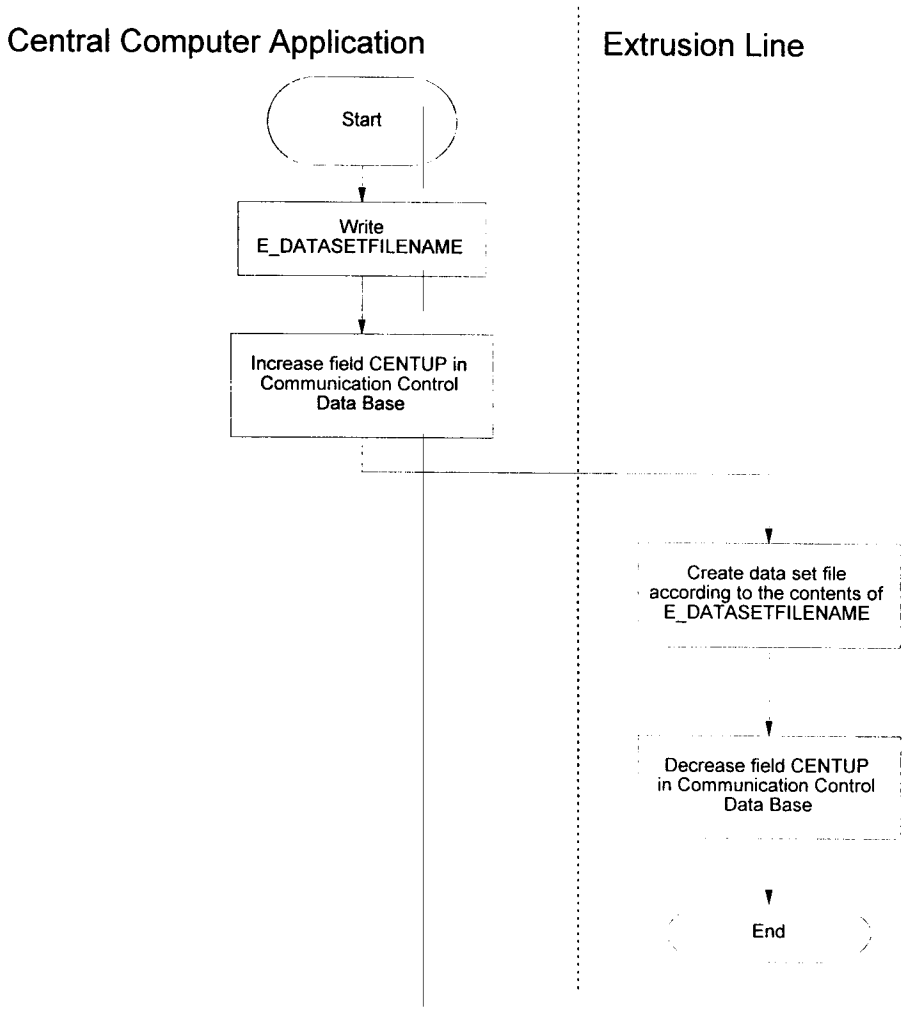
The variable values are written into the field V of the Report Control Data Base (Figure 8). If the variable block contains more than 255 characters, the field V of the next record is used.

## 4.10 Data Set Transfer

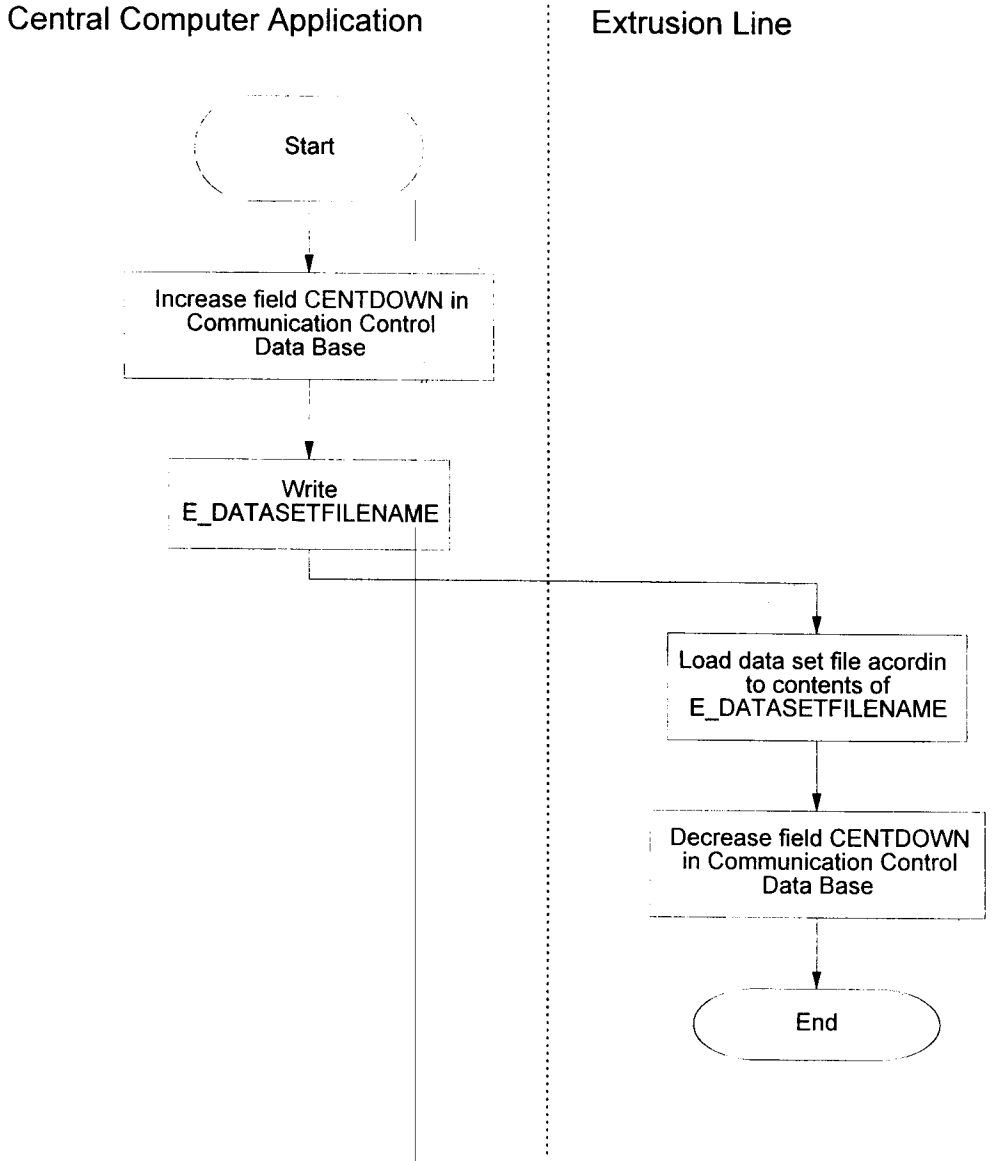
Data Set Transfer is for exchange and storage of machine specific data sets on a Central Computer Application in a data file.
The Central Computer Application has to store and to manage this data without being able to analyse it.
A Data Set file contains information about setting data, recipe, PLC-programs, PLC-status and set up data for drives.
A Data Set filename contains an identification for the extrusion line.
Therefore is defined that the last three positions of a filename contain information about the extrusion line.
E. g. TESTDATA.001 means this Data Set is used for extrusion line 1.
Only 1 Data Set Transfer is possible at one time. This restriction is made for safety purposes.
In practice, there are 4 ways of Data Set Transfer possible:

1) Upload of Data Set, initiated by the Central Computer Application
2) Download of Data Set, initiated by the Central Computer Application
3) Upload of Data Set, initiated by Extrusion Line
4) Download of Data Set, initiated by Extrusion Line

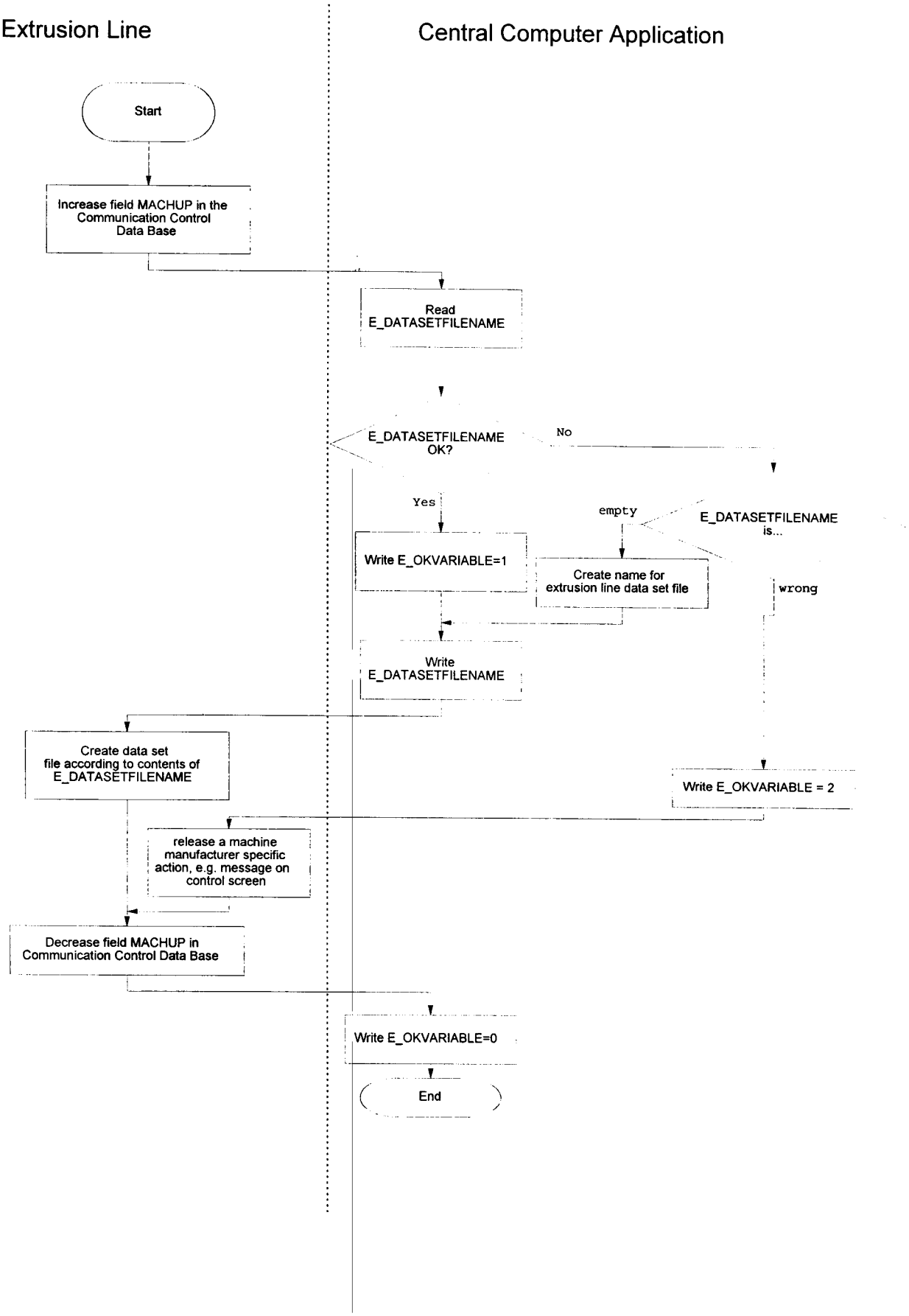
### 4.10.1 Upload of Data Set, initiated by the Central Computer Application



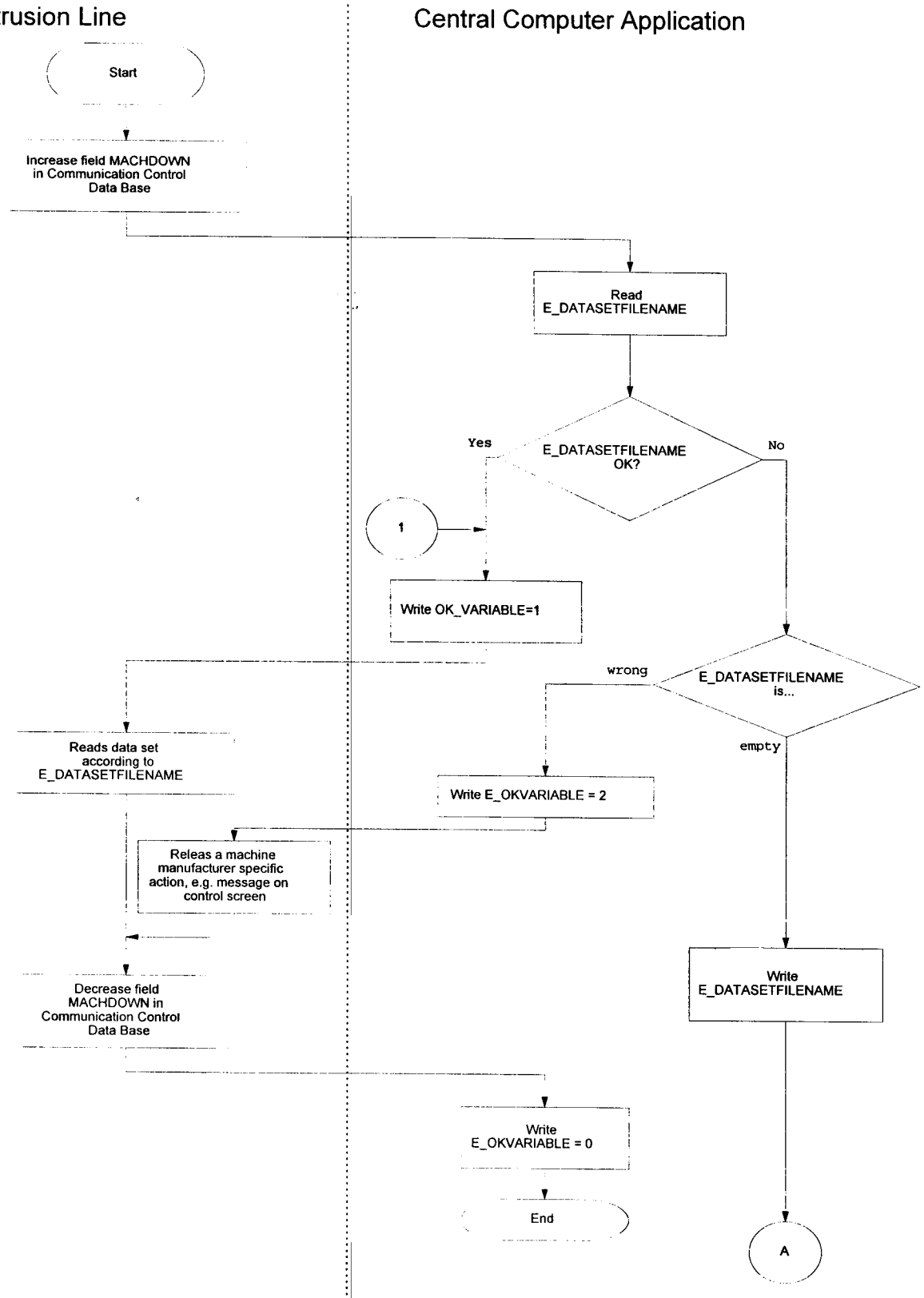
### 4.10.2 Download of Data Set, initiated by the Central Computer Application

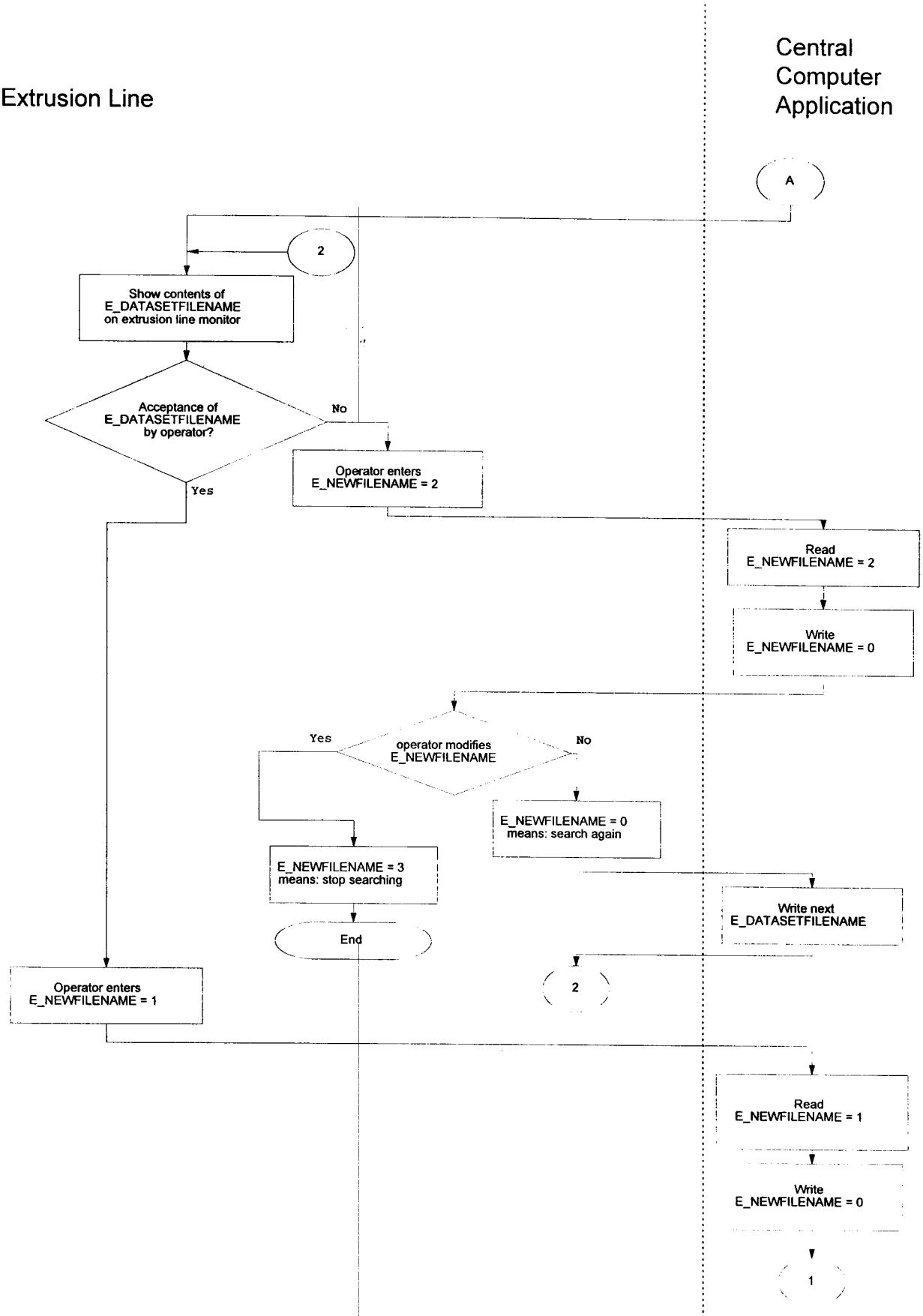


## 4.10.3 Upload of Data Set, initiated by Extrusion Line



## 4.10.4 Download of Data Set, initiated by Extrusion Line




Extrusion Line
Central Computer Application
A
2
Show contents of E_DATASETFILENAME on extrusion line monitor
Acceptance of E_DATASETFILENAME by operator?
No
Yes
Operator enters E_NEWFILENAME = 2
Read E_NEWFILENAME = 2
Write E_NEWFILENAME = 0
Yes
operator modifies E_NEWFILENAME
No
E_NEWFILENAME = 0 means: search again
E_NEWFILENAME = 3 means: stop searching
End
Write next E_DATASETFILENAME
2
Operator enters E_NEWFILENAME = 1
Read E_NEWFILENAME = 1
Write E_NEWFILENAME = 0
1

### 4.11 Central Computer Applications

- **Production data** acquisition, machine data acquisition (e.g. alarms, downtimes), production planning
- **Process data** acquisition (e.g. actual values)
- **Part quality data** acquisition (e.g. wall thickness, width, length, weight, SPC-values)
- **DNC** (setting data, recipe, PLC-programs, PLC-status, set up data for drives)

## 5 Layout of Extrusion Lines

Figure 9 shows the layout of different extrusion lines including the downstream equipment. The variables defined in the variable list of the annex are structured according to this layout.

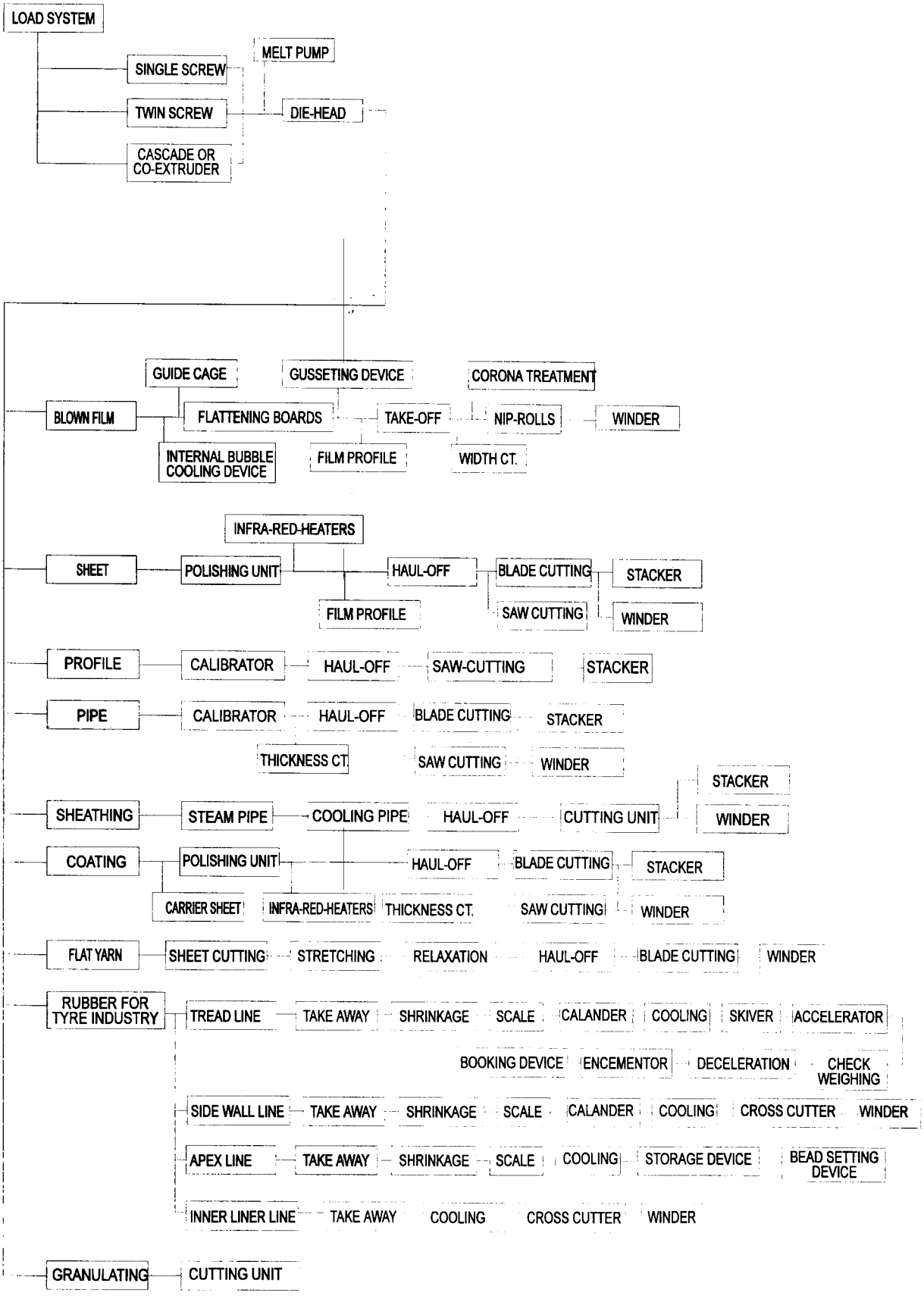



**Figure 9: Layout of Extrusion Lines**

## 6 Literature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